AXIOMTEK

MANO881 Series

Intel® Socket 1150 Core™ i7/ i5/ i3/ Celeron® Processor Mini ITX Board with HDMI/ VGA/ LVDS

User's Manual

RoHS

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Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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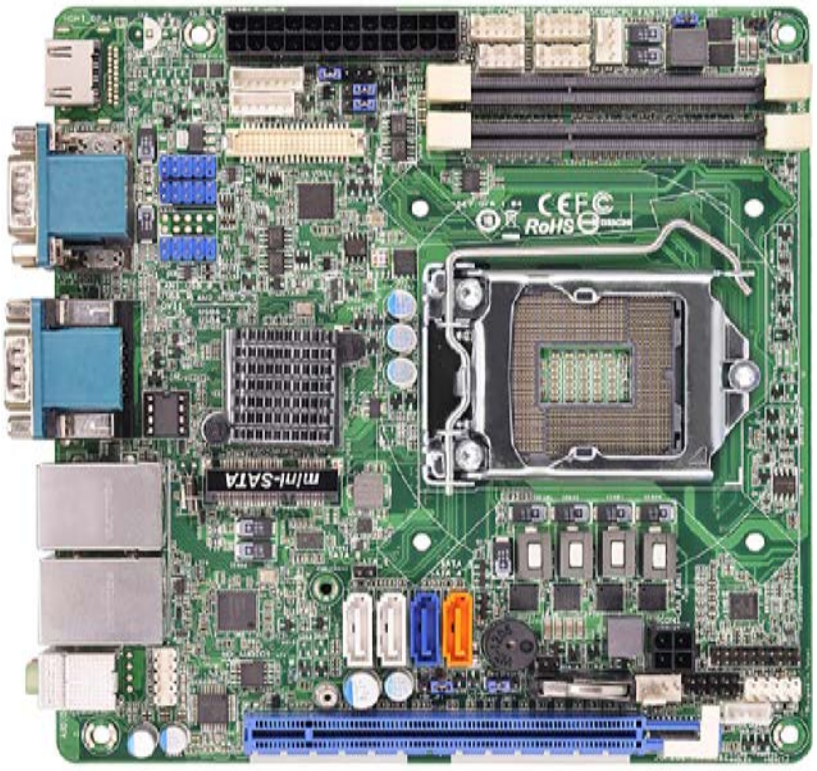
Chapter 1
Introduction



The MANO881 is a Mini ITX board based on the 4th Generation Intel® Core™ i7 / i5 / i3 / Celeron® processors (codename: Haswell) in LGA1150 socket. This motherboard integrates Intel® H81 chipset that delivers outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions. There are two 204-pin DDR3 SO-DIMM for dual channel DDR3 1600/1333MHz memory with maximum capacity up to 16GB; assuming dual channel mode of two 8GB double-sided unbuffered, non-ECC SO-DIMM memory configuration. It also features two Gigabit Ethernet ports, two SATA 3.0 ports with maximum transfer rate up to 6Gb/s, two SATA 2.0 ports with maximum transfer rate up to 3Gb/s, two USB 3.0 and eight USB 2.0 high speed compliant ports that can achieve the best stability and reliability for industrial applications.

1.1 Features

- LGA1150 Socket 4th Generation Intel® Core™ i7/ i5/ i3/ Celeron® processors (codename: Haswell)
- 2 DDR3 1600/1333MHz max. up to 16GB memory capacity
- PCI-Express x16 Gen. 2 supported
- 1 mSATA supported
- 2 SATA-600 and 2 SATA-300 supported
- 2 USB 3.0 and 8 USB 2.0 ports
- Dual view display
- Display: HDMI/VGA/LVDS

1.2 Specifications

- **CPU**
  - Intel® Core™ i7/ i5/ i3/ Celeron® processors.
- **System Chipset**
  - Intel® H81.
- **CPU Socket**
  - LGA1150 socket.
- **BIOS**
  - AMI BIOS via SPI interface with socket.
- **System Memory**
  - Two 204-pin SO-DIMM sockets.
  - Maximum up to 16GB DDR3 memory.
  - Support 1600/1333MHz memory.
- **L3 Cache**
  - Varies with CPU.
- **Onboard Multi I/O**
  - One PS/2 keyboard and mouse in internal box header.
  - Serial ports: Three ports for RS-232/422/485 (COM1/2/3) on the rear I/O. Three ports for RS-232 (COM4/5/6) in internal box headers.
- **USB Interface**
  - Two USB 3.0 ports.
  - Eight USB 2.0 ports (2 on the rear I/O and 6 in box headers).
- **Onboard Graphics**
  - Intel® HD 5000 Integrated Graphics (depends on CPU).
  - Display memory: Max. shared system memory up to 1759MB.
  - One HDMI: Resolution max. up to 4096x2304 @ 75Hz.
  - One VGA: Resolution max. up to 1920x1200 @ 60Hz.
  - One LVDS: Resolution max. up to 1920x1080 dual channel.
- **Ethernet**
  - LAN1: Intel® i217LM, supports 1000/100/10 Base-T Gigabit Ethernet with Wake-on-LAN and PXE Boot ROM.
  - LAN2: Intel® i210 supports 1000/100/10 Base-T Gigabit Ethernet with Wake-on-LAN and PXE Boot ROM.

- **Serial ATA**
  - Two SATA 3.0 ports (6Gb/s).
  - Two SATA 2.0 ports (3Gb/s).

- **Audio**
  - HD codec audio as MIC-in/line-out with Realtek ALC662.

- **Expansion Slot**
  - One PCI-Express x16 Gen. 2.
  - One mSATA.

- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.

Note

All specifications and images are subject to change without notice.

1.3 Utilities Supported

- Intel® chipset drivers
- Intel® graphics drivers
- Ethernet utility and drivers
- Intel® USB 3.0 drivers
- HD audio drivers
- RAID utility
- iAMT utility and drivers

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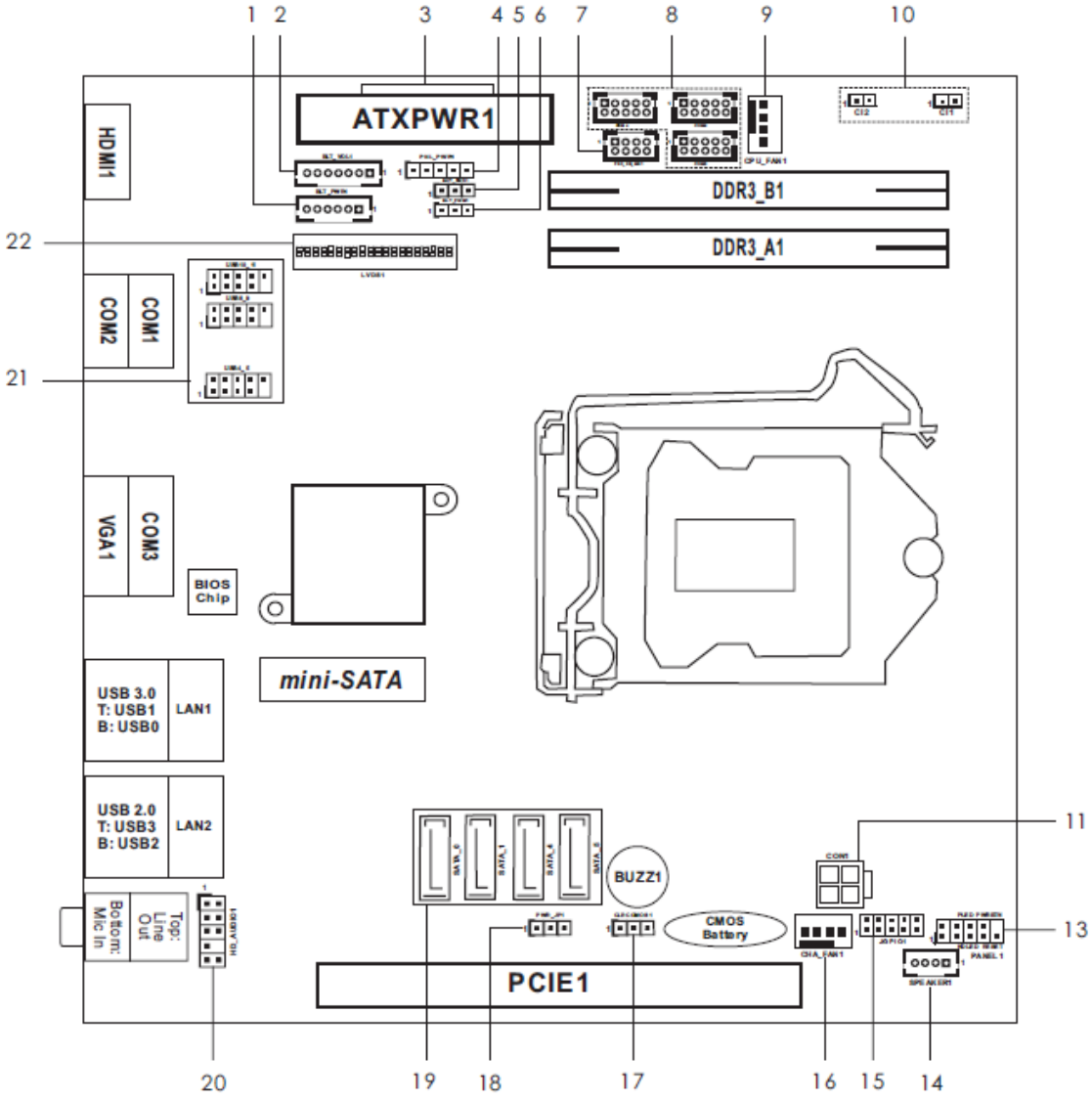
Chapter 2
Board and Pin Assignments

2.1 Board Layout



Top View

1 : Backlight Power Connector (BLT_PWR1)

2 : Backlight Volume Control Connector (BLT_VOL1)

3 : 24-pin ATX Power Input Connector (ATXPWR1)

4 : Panel Power Selection (PNL_PWR1)

5 : Backlight Power Selection (BKT_PWR1)

6 : PWM Level Selection (BLT_PWM1)

7 : PS/2 Keyboard and Mouse Connector (PS2_KB_MS1)

8 : RS-232 Port Headers (COM4, COM5, COM6)

9 : 4-pin +12V CPU Fan Connector (CPU_FAN1)

10 : Chassis Intrusion Headers (CI1, CI2)

11 : 4-pin ATX Power Input Connector (CON1)

13 : System Panel Header (PANEL1)

14 : 3W Audio AMP Output Wafer (SPEAKER1)

15 : Digital Input/Output Header (JGPIO1)

16 : 4-pin +12V Chassis Fan Connector (CHA_FAN1)

17 : Restore BIOS Optimal Defaults Jumper (CLRCMOS1)

18 : ATX/AT Power Mode Jumper (PWR_JP1)

19 : SATA 3.0 Connectors (SATA_0, SATA_1)

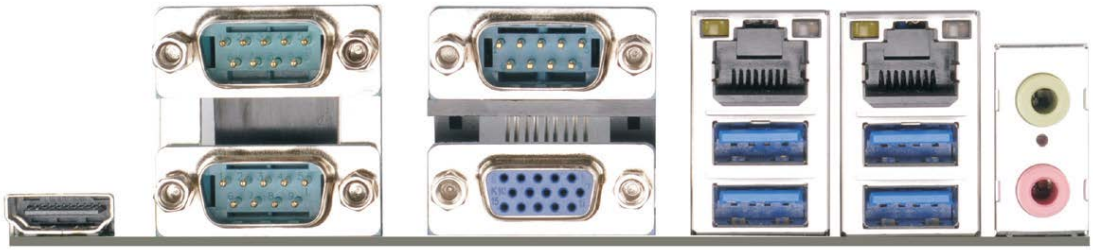
SATA 2.0 Connectors (SATA_4, SATA_5)

20 : Front Panel Audio Header (HD_AUDIO1)

21 : USB 2.0 Headers (USB4_5, USB8_9, USB10_11)

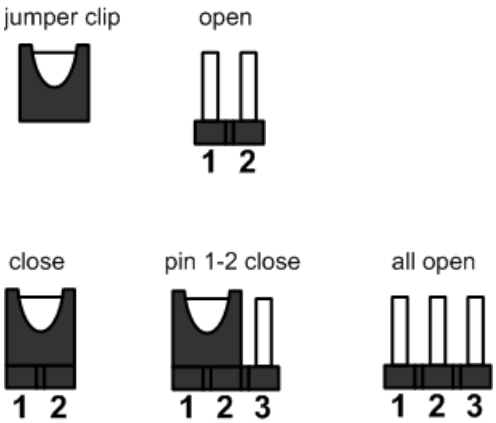
22 : LVDS Panel Connector (LVDS1)

2.2 Rear Panel I/O



2.3 Jumper Settings

Jumper is a small component consisting of jumper clip and jumper pins. Install jumper clip on 2 jumper pins to close. And remove jumper clip from 2 jumper pins to open. The following illustration shows how to set up jumper.



Before applying power to MANO881 Series, please make sure all of the jumpers are in factory default position. Below you can find a summary table of all jumpers and onboard default settings.

Jumper	Description	Setting
CLRCMOS1	Restore BIOS Optimal Defaults Default: Normal Operation	1-2 Close
PNL_PWR1	Panel Power Selection Default: +3V	1-2 Close
BKT_PWR1	Backlight Power Selection Default: +5V	1-2 Close
PWR_JP1	ATX/AT Power Mode Jumper Default: ATX Mode	2-3 Close
BLT_PWM1	PWM Level Selection Default: +5V	2-3 Close

2.3.1 Restore BIOS Optimal Defaults (CLRCMOS1)

CLRCMOS1 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper clip to short pin 2 and pin 3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, user default profile and MAC address will be cleared only if the CMOS battery is removed.

Function	Setting
Normal (Default)	1-2 close
Restore BIOS optimal defaults	2-3 close

2.3.2 Panel Power Selection (PNL_PWR1)

This motherboard supports voltage selection for flat panel displays. Use this jumper to set power of LVDS panel to +3V, +5V or +12V. To prevent hardware damage, before connecting please make sure that the input voltage of LVDS panel is correct.

Function	Setting
+3V (Default)	1-2 close
+5V	2-3 close
+12V	4-5 close

2.3.3 Backlight Power Selection (BKT_PWR1)

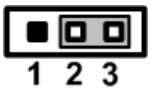
This jumper allows you to select backlight power for LVDS panel.

Function	Setting
+5V (Default)	1-2 close
+12V	2-3 close

2.3.4 AT/ATX Power Mode Jumper (PWR_JP1)

This jumper allows you to select ATX power or AT power mode.

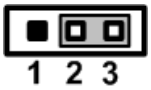
Function	Setting
AT mode	1-2 close
ATX mode (Default)	2-3 close



2.3.5 PWM Level Selection (BLT_PWM1)

This jumper allows you to select PWM level.

Function	Setting
+3V level	1-2 close
+5V level (Default)	2-3 close



2.4 Headers and Connectors

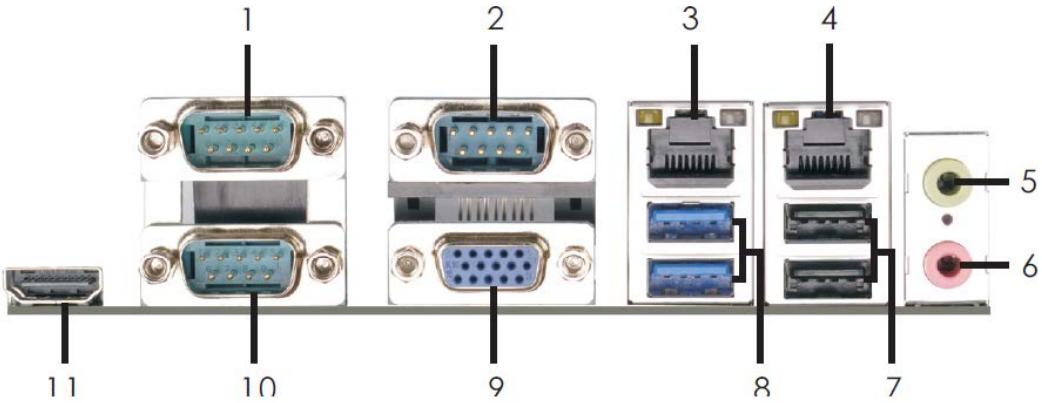
Signals go to other parts of the system through headers and connectors. Loose or improper connection might cause problems, please make sure all headers and connectors are properly and firmly connected. Here is a summary table showing headers and connectors on the hardware.

Note

Onboard headers and connectors are NOT jumpers. Do NOT place jumper clips over these headers and connectors. Placing jumper clips over the headers and connectors will cause permanent damage of the motherboard!

Header and Connector	Description
BLT_PWR1	Backlight Power Connector
BLT_VOL1	Backlight Volume Control Connector
ATXPWR1	24-pin ATX Power Input Connector
PS2_KB_MS1	PS/2 Keyboard and Mouse Connector
COM4~COM6	RS-232 Port Headers
CPU_FAN1	4-pin +12V CPU Fan Connector
CI1~CI2	Chassis Intrusion Headers
CON1	4-pin ATX Power Input Connector
PANEL1	System Panel Header
SPEAKER1	3W Audio AMP Output Wafer
JGPIO1	Digital I/O Header
CHA_FAN1	4-pin +12V Chassis Fan Connector
SATA_0~SATA_1	SATA 3.0 Connectors
SATA_4~SATA_5	SATA 2.0 Connectors
HD_AUDIO1	Front Panel Audio Header
USB4_5, USB8_9, USB10_11	USB 2.0 Headers
LVDS1	LVDS Panel Connector
PCIE1	PCI-Express x16 Slot
mini-SATA	mSATA Slot
DDR3_A1	204-pin DDR3 SO-DIMM Socket A1
DDR3_B1	204-pin DDR3 SO-DIMM Socket B1

2.4.1 Rear Panel Connectors



1	**COM Port (COM1)***	**7**	**USB 2.0 Ports (T:USB3, B:USB2)**
2	**COM Port (COM3)***	**8**	**USB 3.0 Ports (T:USB1, B:USB0)**
3	**LAN RJ-45 Port (LAN1)****	**9**	**D-Sub VGA Port (VGA1)**
4	**LAN RJ-45 Port (LAN2)****	**10**	**COM Port (COM2)***
5	**Line-out (Lime)**	**11**	**HDMI Port (HDMI1)**
6	**Microphone (Pink)**		

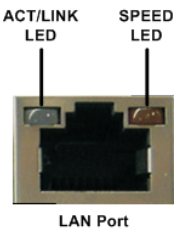
* This motherboard supports RS-232/422/485 on COM1~COM3 ports. The pin assignments are listed in table below. If you need to adjust these COM ports to work as RS-232/422/485, please refer to BIOS setting in section 5.4.

Pin	RS-232	RS-422	RS-485
1	DCD, Data Carrier Detect	TX-	RTX-
2	RXD, Receive Data	RX+	N/A
3	TXD, Transmit Data	TX+	RTX+
4	DTR, Data Terminal Ready	RX-	N/A
5	GND	GND	GND
6	DSR, Data Set Ready	N/A	N/A
7	RTS, Request To Send	N/A	N/A
8	CTS, Clear To Send	N/A	N/A
9	No Power/+5V/+12V	N/A	N/A

** There are two LEDs next to the LAN port. Please refer to the table below for the LAN port LED indications.

LAN Port LED Indications

Activity/Link LED		SPEED LED	
Status	**Description**	**Status**	**Description**
OFF	No link	OFF	10Mbps connection
Blinking	Data activity	Orange	100Mbps connection
ON	Link	Green	1Gbps connection



2.4.2 Backlight Power Connector (BLT_PWR1)

The backlight power interface is available through this connector.

Pin	Signal
1	GND
2	GND
3	BL CTL
4	BL EN
5	LCD_BLT_VCC
6	LCD_BLT_VCC

2.4.3 Backlight Volume Control Connector (BLT_VOL1)

The backlight volume control interface is available through this connector.

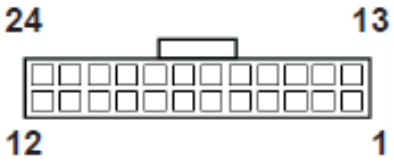
Pin	Signal
1	GPIO_VOL_UP
2	GPIO_VOL_DW
3	PWRDN
4	LVDS1 BLUP
5	LVDS1 BLDW
6	GND
7	GND

2.4.4 ATX Power Input Connectors (ATXPWR1 and CON1)

Steady and sufficient power can be supplied to all components on the motherboard by connecting power connector. Please make sure all components and devices are properly installed before connecting the power connector. External power supply plug fits into this connector in only one orientation. Properly press down power supply plug until it completely and firmly fits into this connector. Loose connection may cause system instability.

The ATXPWR1 is a 24-pin ATX power connector. Please connect an ATX power supply to this connector.

Pin	Signal	Pin	Signal
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS_ON
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWR OK	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	3.3V	24	GND



Note

Though this motherboard provides 24-pin ATX power connector, it can still work if you adopt a traditional 20-pin ATX power supply. To use the 20-pin ATX power supply, please plug your power supply along with pin 1 and pin 13.

20-pin ATX power supply installation

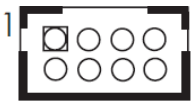
The CON1 is a 4-pin ATX power connector. Please connect a 12V ATX power supply to this connector.

Pin	Signal	Pin	Signal
1	GND	3	+12V
2	GND	4	+12V

2.4.5 PS/2 Keyboard and Mouse Connector (PS2_KB_MS1)

This is an interface for PS/2 keyboard and mouse.

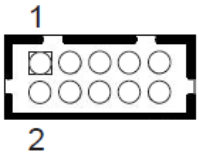
Pin	Signal
1	KBCLK
2	+5V
3	KBDATA
4	+5V
5	MSDATA
6	GND
7	MSCLK
8	GND



2.4.6 RS-232 Port Wafers (COM4~COM6)

COM4/COM5/COM6:

Pin	Signal	Pin	Signal
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	No Power/+5V/+12V
5	GND	10	NC

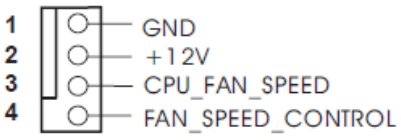


2.4.7 Fan Connectors (CPU_FAN1 and CHA_FAN1)

Fans are always needed for cooling down CPU and system temperature. This motherboard has two fan connectors.

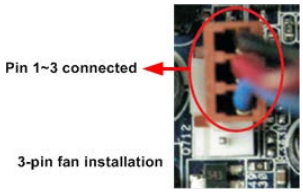
The CPU_FAN1 is for CPU fan interface. Please connect the CPU fan cable to the connector and match the black wire to the ground pin.

Pin	Signal
1	GND
2	+12V
3	CPU_FAN_SPEED
4	FAN_SPEED_CONTROL



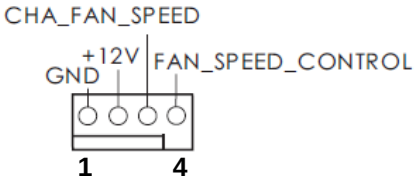
Note

Though this motherboard provides 4-pin CPU fan (Quiet Fan) support, the 3-pin CPU fan still can work successfully even without the fan speed control function. If you plan to connect the 3-pin CPU fan to the CPU fan connector on this motherboard, please connect it to pin 1~3.



The CHA_FAN1 is for chassis fan interface. Please connect the fan cable to the fan connector and match the black wire to the ground pin.

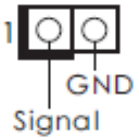
Pin	Signal
1	GND
2	+12V
3	CHA_FAN_SPEED
4	FAN_SPEED_CONTROL



2.4.8 Chassis Intrusion Headers (CI1~CI2)

This motherboard supports CASE OPEN detection feature that detects if the chassis cover has been removed. This feature requires a chassis with chassis intrusion detection design.

Pin	Signal
1	Signal
2	GND



Note

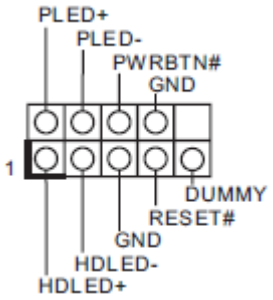
CI1:
- Close: Active case open.
- Open : Normal.

CI2:
- Close: Normal.
- Open: Active case open.

2.4.9 System Panel Header (PANEL1)

This header accommodates several system front panel functions.

Pin	Signal	Pin	Signal
1	HDLED+	2	PLED+
3	HDLED-	4	PLED-
5	GND	6	PWRBTN#
7	RESET#	8	GND
9	DUMMY		



Connect the power switch, reset switch and system status indicator on the chassis to this header according to the pin assignments below. Note the positive and negative pins before connecting the cables.

PWRBTN (Power Switch)
Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

RESET (Reset Switch)
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED)
Connect to the power status indicator on the chassis front panel. The LED is ON when the system is operating. The LED keeps blinking when the system is in S1/S3 sleep state. The LED is OFF when the system is in S4 sleep state or powered off (S5).

HDLED (Hard Drive Activity LED)
Connect to the hard drive activity LED on the chassis front panel. The LED is ON when the hard drive is reading or writing data.

The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly

2.4.10 Audio AMP Output Wafer (SPEAKER1)

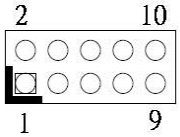
The SPEAKER1 is for 3W audio AMP output interface.

Pin	Signal
1	SPK L-
2	SPK L+
3	SPK R+
4	SPK R-

2.4.11 Digital I/O Header (JGPIO1)

The JGPIO1 is for digital I/O interface.

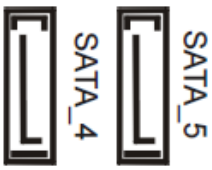
Pin	Signal	Pin	Signal
1	SIO_GP24	2	SIO_GP20
3	SIO_GP25	4	SIO_GP21
5	SIO_GP26	6	SIO_GP22
7	SIO_GP27	8	SIO_GP23
9	JGPIO_PWR1	10	GND



2.4.12 SATA Connectors (SATA_0~SATA_1 and SATA_4~SATA_5)

These two Serial ATA 3.0 (SATA 3.0) connectors support SATA data cables for internal storage devices. The current SATA 3.0 interface allows up to 6.0Gb/s data transfer rate.

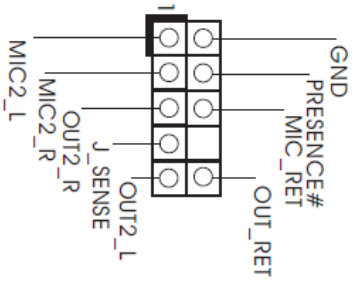
These two Serial ATA 2.0 (SATA 2.0) connectors support SATA data cables for internal storage devices. The current SATA 2.0 interface allows up to 3.0Gb/s data transfer rate.



2.4.13 Front Panel Audio Header (HD_AUDIO1)

This is an interface for front panel audio cable that allows convenient connection and control of audio devices.

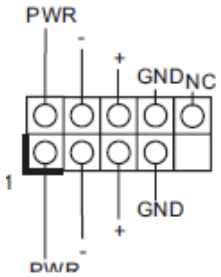
Pin	Signal	Pin	Signal
1	MIC2_L	2	GND
3	MIC2_R	4	PRESENCE#
5	OUT2_R	6	MIC_RET
7	J_SENSE		
9	OUT2_L	10	OUT_RET



2.4.14 USB 2.0 Headers (USB4_5, USB8_9 and USB10_11)

There are three USB 2.0 headers on this motherboard. Each USB 2.0 header can support two USB 2.0 ports.

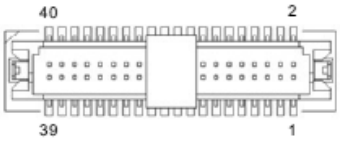
Pin	Signal	Pin	Signal
1	PWR	2	PWR
3	USB DX-	4	USB DY-
5	USB DX+	6	USB DY+
7	GND	8	GND
		10	NC



2.4.15 LVDS Panel Connector (LVDS1)

This is an interface for LVDS panel.

Pin	Signal	Pin	Signal
1	LVDD	2	LVDD
3	+3V	4	N/A
5	N/A	6	LVDS_A_DATA0#
7	LVDS_A_DATA0	8	GND1
9	LVDS_A_DATA1#	10	LVDS_A_DATA1
11	GND6	12	LVDS_A_DATA2#
13	LVDS_A_DATA2	14	GND2
15	LVDS_A_DATA3#	16	LVDS_A_DATA3
17	GND7	18	LVDS_A_CLK#
19	LVDS_A_CLK	20	GND3
21	LVDS_B_DATA0#	22	LVDS_B_DATA0
23	GND8	24	LVDS_B_DATA1#
25	LVDS_B_DATA1	26	GND4
27	LVDS_B_DATA2#	28	LVDS_B_DATA2
29	DPLVDD_EN	30	LVDS_B_DATA3#
31	LVDS_B_DATA3	32	GND5
33	LVDS_B_CLK#	34	LVDS_B_CLK
35	GND9	36	CON_LBKLT_EN
37	CON_LBKLT_CTR	38	LCD_BLT_VCC
39	LCD_BLT_VCC	40	LCD_BLT_VCC



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Chapter 3
Hardware Installation

This is a Mini ITX form factor (6.7”x6.7”, 17.0x17.0 cm) motherboard. Before you install the motherboard, study the configuration of your chassis to ensure that the motherboard fits into it.

Note

Make sure to unplug the power cord before installing or removing the motherboard. Failure to do so may cause physical injuries to you and damages to motherboard components.

3.1 Screw Holes

Place screws into the holes to secure the motherboard to the chassis

Note

Do not over-tighten the screws! Doing so may damage the motherboard.

3.2 Pre-installation Precautions

Take note of the following precautions before you install motherboard components or change any motherboard settings

1. Unplug the power cord from the wall socket before touching any component.
2. To avoid damaging the motherboard components due to static electricity, NEVER place your motherboard directly on the carpet or the like. Also remember to use a grounded wrist strap or touch a safety grounded object before you handle components.
3. Hold components by the edges and do not touch the ICs.
4. Whenever you uninstall any component, place it on a grounded antistatic pad or in the bag that comes with the component.

Note

Before you install or remove any component, ensure that the power is switched off or the power cord is detached from the power supply. Failure to do so may cause severe damage to the motherboard, peripherals and/or components.

3.3 Installing Memory Modules (SO-DIMM)

This motherboard provides two 204-pin DDR3 (Double Data Rate 3) SO-DIMM sockets.

Note

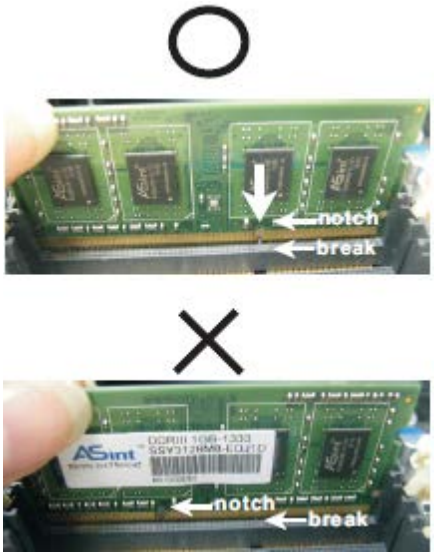
It is not allowed to install a DDR or DDR2 memory module into DDR3 socket; otherwise, this motherboard and SO-DIMM may be damaged.

Note

Please make sure to disconnect power supply before adding or removing SO-DIMMs or the system components.

Step 1. Unlock a SO-DIMM socket by pressing the retaining clips outward.

Step 2. Align a SO-DIMM module on the socket such that the notch on the module matches the break on the socket.



Note

The SO-DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the SO-DIMM if you force the SO-DIMM into the socket at incorrect orientation.

Step 3. Firmly insert the SO-DIMM into the socket until the retaining clips at both ends fully snap back in place and the SO-DIMM is properly seated.

3.4 Expansion Slots (PCI-Express and mSATA Slots)

There are 1 PCI-Express and 1 mSATA slots on this motherboard.

PCI-Express slots:
PCIE1 (PCI-Express x16 slot; Blue) is used for PCI-Express x16 lane width graphics cards.
mini-SATA (mSATA slot) is used for mSATA cards.

3.5 Installing an Expansion Card

Step 1. Before installing the expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.
Step 2. Remove the system unit cover (if your motherboard is already installed in a chassis).
Step 3. Remove the bracket facing the slot that you intend to use. Keep the screws for later use.
Step 4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
Step 5. Fasten the card to the chassis with screws.
Step 6. Replace the system cover.

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Chapter 4
Hardware Description

4.1 Microprocessors

The MANO881 Series supports Intel® Core™ i7/ i5/ i3/ Celeron® processors, which enable your system to operate under Windows® 7, Windows® 8, Windows® 8.1 and Linux environments. The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

4.2 BIOS

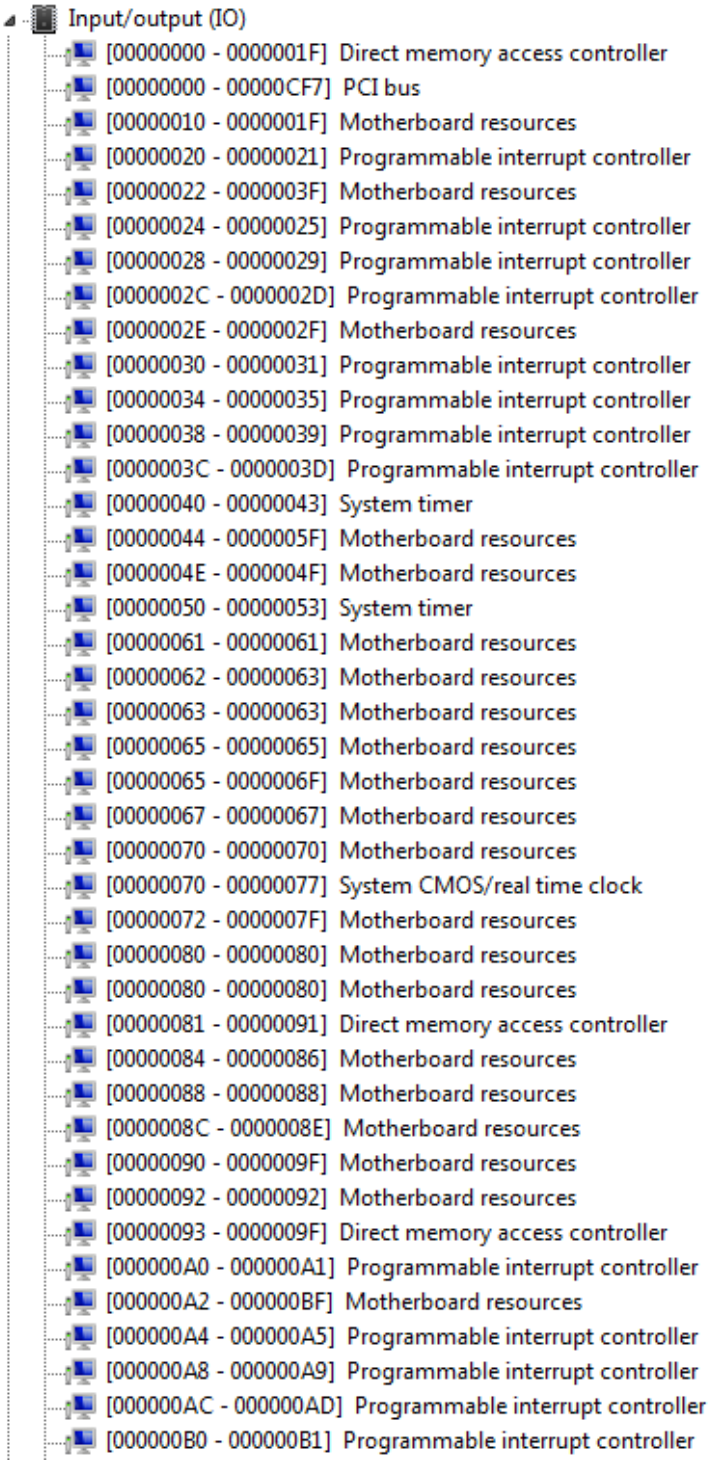
The MANO881 Series uses AMI Plug and Play BIOS with a single SPI Flash.

4.3 System Memory

The MANO881 Series supports two 204-pin DDR3 SO-DIMM sockets for a maximum memory of 16GB DDR3 SDRAMs. The memory module comes in sizes of 1GB, 2GB, 4GB and 8GB.

4.4 I/O Port Address Map

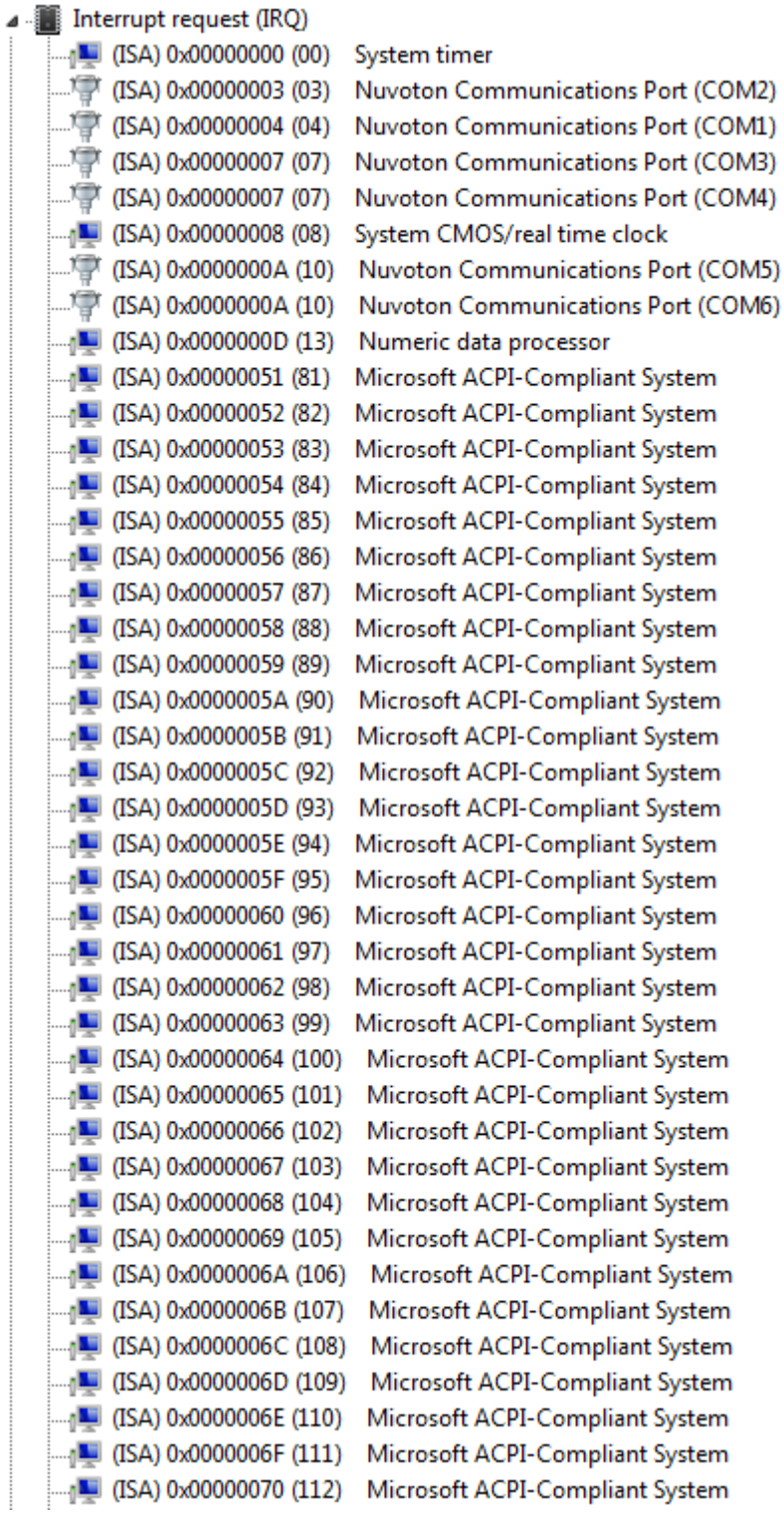
The Intel® Core™ i7/ i5/ i3/ Celeron® processors communicate via I/O ports. Total 1KB port addresses are available for assigning to other devices via I/O expansion cards.


Input/output (IO)
[00000000 - 0000001F] Direct memory access controller
[00000000 - 00000CF7] PCI bus
[00000010 - 0000001F] Motherboard resources
[00000020 - 00000021] Programmable interrupt controller
[00000022 - 0000003F] Motherboard resources
[00000024 - 00000025] Programmable interrupt controller
[00000028 - 00000029] Programmable interrupt controller
[0000002C - 0000002D] Programmable interrupt controller
[0000002E - 0000002F] Motherboard resources
[00000030 - 00000031] Programmable interrupt controller
[00000034 - 00000035] Programmable interrupt controller
[00000038 - 00000039] Programmable interrupt controller
[0000003C - 0000003D] Programmable interrupt controller
[00000040 - 00000043] System timer
[00000044 - 0000005F] Motherboard resources
[0000004E - 0000004F] Motherboard resources
[00000050 - 00000053] System timer
[00000061 - 00000061] Motherboard resources
[00000062 - 00000063] Motherboard resources
[00000063 - 00000063] Motherboard resources
[00000065 - 00000065] Motherboard resources
[00000065 - 0000006F] Motherboard resources
[00000067 - 00000067] Motherboard resources
[00000070 - 00000070] Motherboard resources
[00000070 - 00000077] System CMOS/real time clock
[00000072 - 0000007F] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000080 - 00000080] Motherboard resources
[00000081 - 00000091] Direct memory access controller
[00000084 - 00000086] Motherboard resources
[00000088 - 00000088] Motherboard resources
[0000008C - 0000008E] Motherboard resources
[00000090 - 0000009F] Motherboard resources
[00000092 - 00000092] Motherboard resources
[00000093 - 0000009F] Direct memory access controller
[000000A0 - 000000A1] Programmable interrupt controller
[000000A2 - 000000BF] Motherboard resources
[000000A4 - 000000A5] Programmable interrupt controller
[000000A8 - 000000A9] Programmable interrupt controller
[000000AC - 000000AD] Programmable interrupt controller
[000000B0 - 000000B1] Programmable interrupt controller

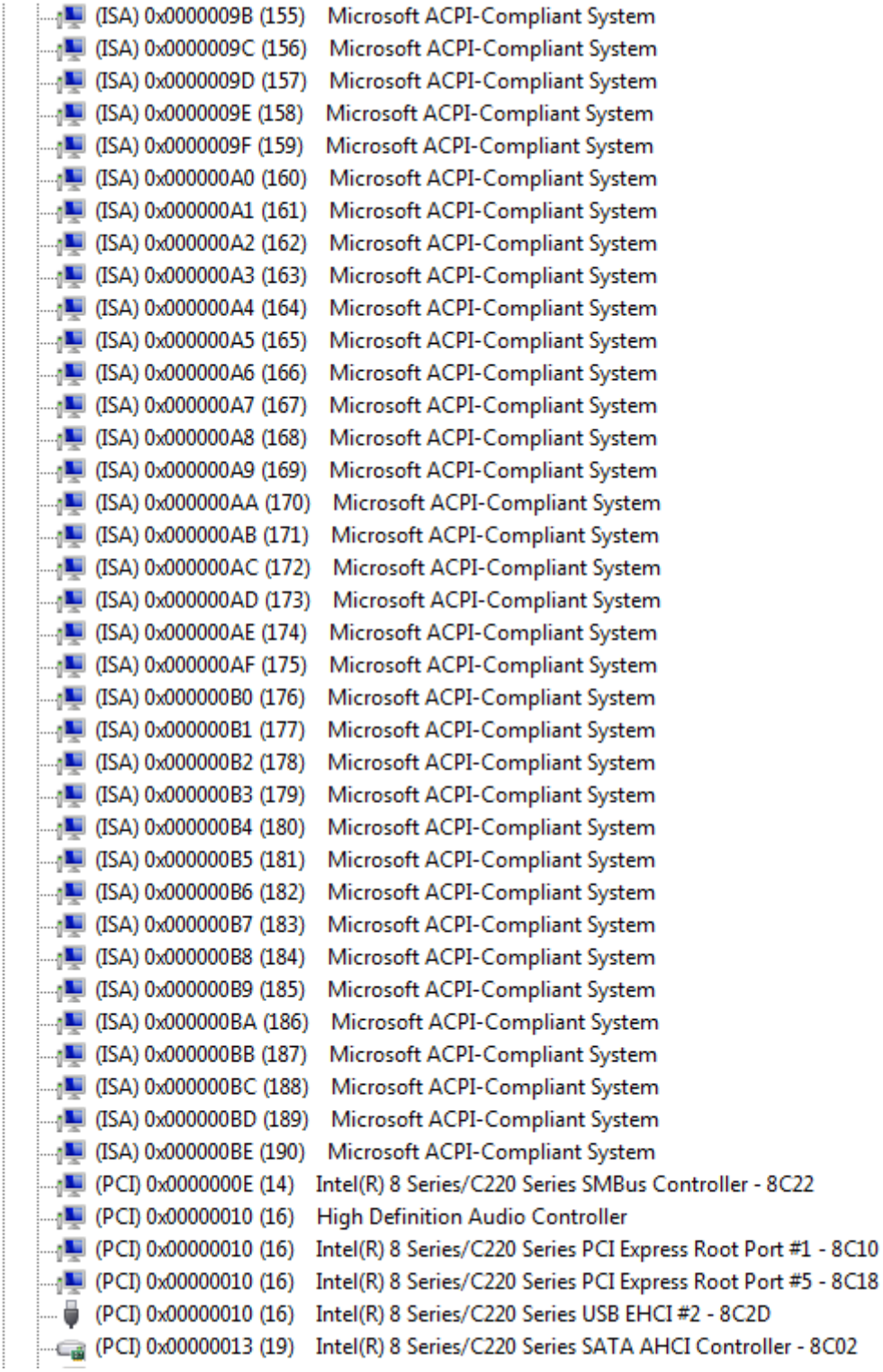
- [000000B2 - 000000B3] Motherboard resources
- [000000B4 - 000000B5] Programmable interrupt controller
- [000000B8 - 000000B9] Programmable interrupt controller
- [000000BC - 000000BD] Programmable interrupt controller
- [000000C0 - 000000DF] Direct memory access controller
- [000000E0 - 000000EF] Motherboard resources
- [000000F0 - 000000FF] Numeric data processor
- [00000290 - 00000297] Motherboard resources
- [000002E0 - 000002E7] Nuvoton Communications Port (COM5)
- [000002E8 - 000002EF] Nuvoton Communications Port (COM4)
- [000002F0 - 000002F7] Nuvoton Communications Port (COM6)
- [000002F8 - 000002FF] Nuvoton Communications Port (COM2)
- [000003B0 - 000003BB] Intel(R) HD Graphics
- [000003C0 - 000003DF] Intel(R) HD Graphics
- [000003E8 - 000003EF] Nuvoton Communications Port (COM3)
- [000003F8 - 000003FF] Nuvoton Communications Port (COM1)
- [000004D0 - 000004D1] Motherboard resources
- [000004D0 - 000004D1] Programmable interrupt controller
- [00000680 - 0000069F] Motherboard resources
- [00000D00 - 0000FFFF] PCI bus
- [0000164E - 0000164F] Motherboard resources
- [00001800 - 000018FE] Motherboard resources
- [00001854 - 00001857] Motherboard resources
- [00001C00 - 00001CFE] Motherboard resources
- [00001D00 - 00001DFE] Motherboard resources
- [00001E00 - 00001EFE] Motherboard resources
- [00001F00 - 00001FFE] Motherboard resources
- [0000E000 - 0000EFFF] Intel(R) 8 Series/C220 Series PCI Express Root Port #5 - 8C18
- [0000F000 - 0000F03F] Intel(R) HD Graphics
- [0000F040 - 0000F05F] Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
- [0000F060 - 0000F07F] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
- [0000F0A0 - 0000F0A3] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
- [0000F0B0 - 0000F0B7] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
- [0000F0C0 - 0000F0C3] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
- [0000F0D0 - 0000F0D7] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
- [0000FFFF - 0000FFFF] Motherboard resources
- [0000FFFF - 0000FFFF] Motherboard resources
- [0000FFFF - 0000FFFF] Motherboard resources

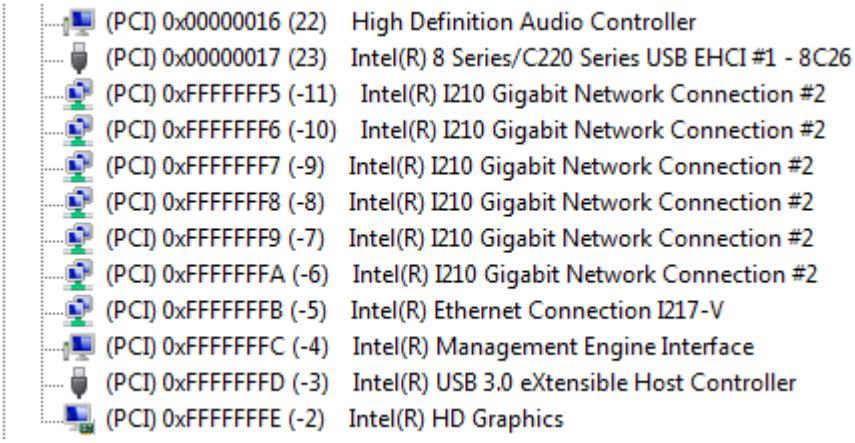
4.5 Interrupt Controller (IRQ) Map

The interrupt controller (IRQ) mapping list is shown as follows:


Interrupt request (IRQ)
(ISA) 0x00000000 (00) System timer
(ISA) 0x00000003 (03) Nuvoton Communications Port (COM2)
(ISA) 0x00000004 (04) Nuvoton Communications Port (COM1)
(ISA) 0x00000007 (07) Nuvoton Communications Port (COM3)
(ISA) 0x00000007 (07) Nuvoton Communications Port (COM4)
(ISA) 0x00000008 (08) System CMOS/real time clock
(ISA) 0x0000000A (10) Nuvoton Communications Port (COM5)
(ISA) 0x0000000A (10) Nuvoton Communications Port (COM6)
(ISA) 0x0000000D (13) Numeric data processor
(ISA) 0x00000051 (81) Microsoft ACPI-Compliant System
(ISA) 0x00000052 (82) Microsoft ACPI-Compliant System
(ISA) 0x00000053 (83) Microsoft ACPI-Compliant System
(ISA) 0x00000054 (84) Microsoft ACPI-Compliant System
(ISA) 0x00000055 (85) Microsoft ACPI-Compliant System
(ISA) 0x00000056 (86) Microsoft ACPI-Compliant System
(ISA) 0x00000057 (87) Microsoft ACPI-Compliant System
(ISA) 0x00000058 (88) Microsoft ACPI-Compliant System
(ISA) 0x00000059 (89) Microsoft ACPI-Compliant System
(ISA) 0x0000005A (90) Microsoft ACPI-Compliant System
(ISA) 0x0000005B (91) Microsoft ACPI-Compliant System
(ISA) 0x0000005C (92) Microsoft ACPI-Compliant System
(ISA) 0x0000005D (93) Microsoft ACPI-Compliant System
(ISA) 0x0000005E (94) Microsoft ACPI-Compliant System
(ISA) 0x0000005F (95) Microsoft ACPI-Compliant System
(ISA) 0x00000060 (96) Microsoft ACPI-Compliant System
(ISA) 0x00000061 (97) Microsoft ACPI-Compliant System
(ISA) 0x00000062 (98) Microsoft ACPI-Compliant System
(ISA) 0x00000063 (99) Microsoft ACPI-Compliant System
(ISA) 0x00000064 (100) Microsoft ACPI-Compliant System
(ISA) 0x00000065 (101) Microsoft ACPI-Compliant System
(ISA) 0x00000066 (102) Microsoft ACPI-Compliant System
(ISA) 0x00000067 (103) Microsoft ACPI-Compliant System
(ISA) 0x00000068 (104) Microsoft ACPI-Compliant System
(ISA) 0x00000069 (105) Microsoft ACPI-Compliant System
(ISA) 0x0000006A (106) Microsoft ACPI-Compliant System
(ISA) 0x0000006B (107) Microsoft ACPI-Compliant System
(ISA) 0x0000006C (108) Microsoft ACPI-Compliant System
(ISA) 0x0000006D (109) Microsoft ACPI-Compliant System
(ISA) 0x0000006E (110) Microsoft ACPI-Compliant System
(ISA) 0x0000006F (111) Microsoft ACPI-Compliant System
(ISA) 0x00000070 (112) Microsoft ACPI-Compliant System

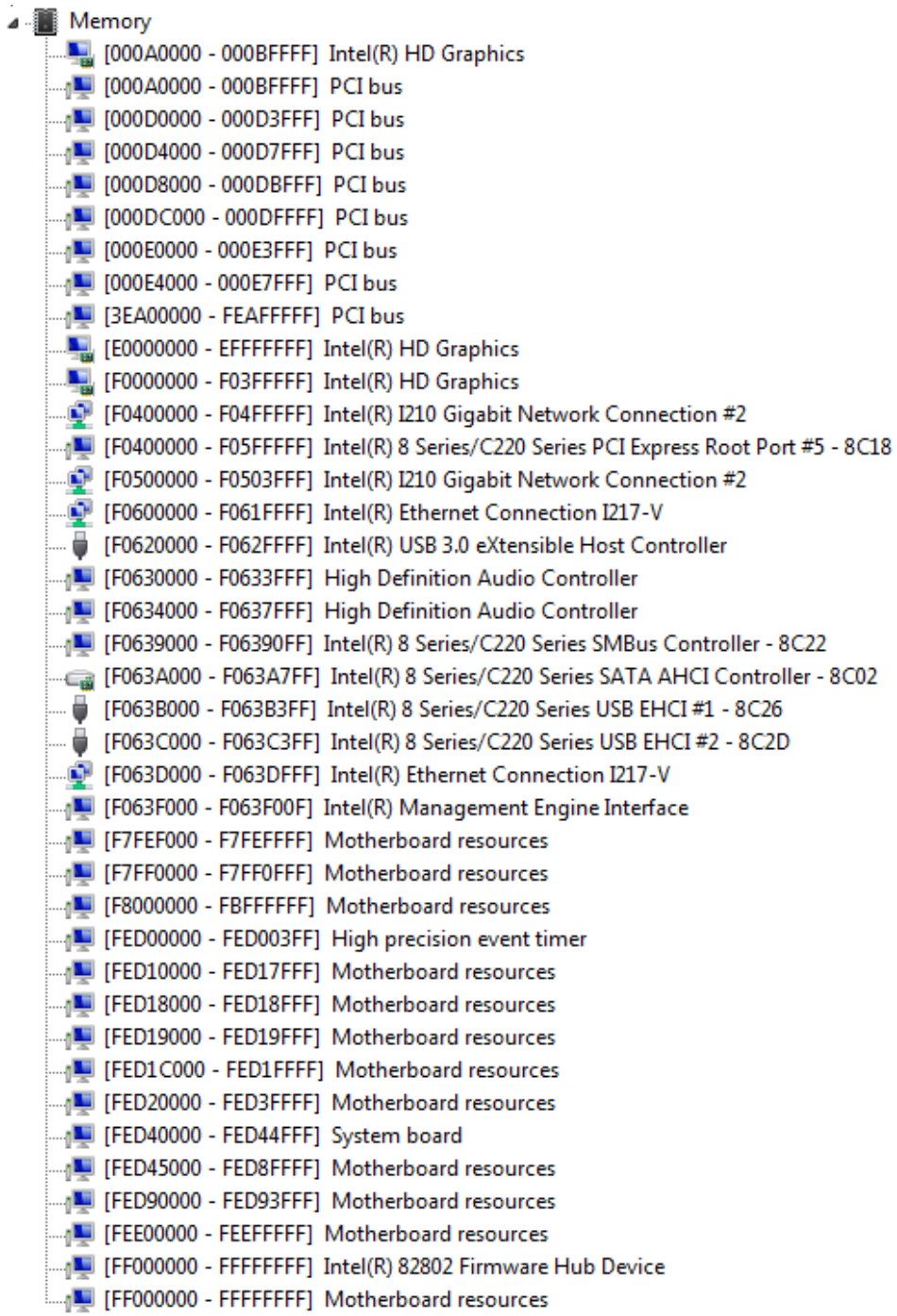
(ISA) 0x00000071 (113) Microsoft ACPI-Compliant System
(ISA) 0x00000072 (114) Microsoft ACPI-Compliant System
(ISA) 0x00000073 (115) Microsoft ACPI-Compliant System
(ISA) 0x00000074 (116) Microsoft ACPI-Compliant System
(ISA) 0x00000075 (117) Microsoft ACPI-Compliant System
(ISA) 0x00000076 (118) Microsoft ACPI-Compliant System
(ISA) 0x00000077 (119) Microsoft ACPI-Compliant System
(ISA) 0x00000078 (120) Microsoft ACPI-Compliant System
(ISA) 0x00000079 (121) Microsoft ACPI-Compliant System
(ISA) 0x0000007A (122) Microsoft ACPI-Compliant System
(ISA) 0x0000007B (123) Microsoft ACPI-Compliant System
(ISA) 0x0000007C (124) Microsoft ACPI-Compliant System
(ISA) 0x0000007D (125) Microsoft ACPI-Compliant System
(ISA) 0x0000007E (126) Microsoft ACPI-Compliant System
(ISA) 0x0000007F (127) Microsoft ACPI-Compliant System
(ISA) 0x00000080 (128) Microsoft ACPI-Compliant System
(ISA) 0x00000081 (129) Microsoft ACPI-Compliant System
(ISA) 0x00000082 (130) Microsoft ACPI-Compliant System
(ISA) 0x00000083 (131) Microsoft ACPI-Compliant System
(ISA) 0x00000084 (132) Microsoft ACPI-Compliant System
(ISA) 0x00000085 (133) Microsoft ACPI-Compliant System
(ISA) 0x00000086 (134) Microsoft ACPI-Compliant System
(ISA) 0x00000087 (135) Microsoft ACPI-Compliant System
(ISA) 0x00000088 (136) Microsoft ACPI-Compliant System
(ISA) 0x00000089 (137) Microsoft ACPI-Compliant System
(ISA) 0x0000008A (138) Microsoft ACPI-Compliant System
(ISA) 0x0000008B (139) Microsoft ACPI-Compliant System
(ISA) 0x0000008C (140) Microsoft ACPI-Compliant System
(ISA) 0x0000008D (141) Microsoft ACPI-Compliant System
(ISA) 0x0000008E (142) Microsoft ACPI-Compliant System
(ISA) 0x0000008F (143) Microsoft ACPI-Compliant System
(ISA) 0x00000090 (144) Microsoft ACPI-Compliant System
(ISA) 0x00000091 (145) Microsoft ACPI-Compliant System
(ISA) 0x00000092 (146) Microsoft ACPI-Compliant System
(ISA) 0x00000093 (147) Microsoft ACPI-Compliant System
(ISA) 0x00000094 (148) Microsoft ACPI-Compliant System
(ISA) 0x00000095 (149) Microsoft ACPI-Compliant System
(ISA) 0x00000096 (150) Microsoft ACPI-Compliant System
(ISA) 0x00000097 (151) Microsoft ACPI-Compliant System
(ISA) 0x00000098 (152) Microsoft ACPI-Compliant System
(ISA) 0x00000099 (153) Microsoft ACPI-Compliant System
(ISA) 0x0000009A (154) Microsoft ACPI-Compliant System


(ISA) 0x0000009B (155) Microsoft ACPI-Compliant System
(ISA) 0x0000009C (156) Microsoft ACPI-Compliant System
(ISA) 0x0000009D (157) Microsoft ACPI-Compliant System
(ISA) 0x0000009E (158) Microsoft ACPI-Compliant System
(ISA) 0x0000009F (159) Microsoft ACPI-Compliant System
(ISA) 0x000000A0 (160) Microsoft ACPI-Compliant System
(ISA) 0x000000A1 (161) Microsoft ACPI-Compliant System
(ISA) 0x000000A2 (162) Microsoft ACPI-Compliant System
(ISA) 0x000000A3 (163) Microsoft ACPI-Compliant System
(ISA) 0x000000A4 (164) Microsoft ACPI-Compliant System
(ISA) 0x000000A5 (165) Microsoft ACPI-Compliant System
(ISA) 0x000000A6 (166) Microsoft ACPI-Compliant System
(ISA) 0x000000A7 (167) Microsoft ACPI-Compliant System
(ISA) 0x000000A8 (168) Microsoft ACPI-Compliant System
(ISA) 0x000000A9 (169) Microsoft ACPI-Compliant System
(ISA) 0x000000AA (170) Microsoft ACPI-Compliant System
(ISA) 0x000000AB (171) Microsoft ACPI-Compliant System
(ISA) 0x000000AC (172) Microsoft ACPI-Compliant System
(ISA) 0x000000AD (173) Microsoft ACPI-Compliant System
(ISA) 0x000000AE (174) Microsoft ACPI-Compliant System
(ISA) 0x000000AF (175) Microsoft ACPI-Compliant System
(ISA) 0x000000B0 (176) Microsoft ACPI-Compliant System
(ISA) 0x000000B1 (177) Microsoft ACPI-Compliant System
(ISA) 0x000000B2 (178) Microsoft ACPI-Compliant System
(ISA) 0x000000B3 (179) Microsoft ACPI-Compliant System
(ISA) 0x000000B4 (180) Microsoft ACPI-Compliant System
(ISA) 0x000000B5 (181) Microsoft ACPI-Compliant System
(ISA) 0x000000B6 (182) Microsoft ACPI-Compliant System
(ISA) 0x000000B7 (183) Microsoft ACPI-Compliant System
(ISA) 0x000000B8 (184) Microsoft ACPI-Compliant System
(ISA) 0x000000B9 (185) Microsoft ACPI-Compliant System
(ISA) 0x000000BA (186) Microsoft ACPI-Compliant System
(ISA) 0x000000BB (187) Microsoft ACPI-Compliant System
(ISA) 0x000000BC (188) Microsoft ACPI-Compliant System
(ISA) 0x000000BD (189) Microsoft ACPI-Compliant System
(ISA) 0x000000BE (190) Microsoft ACPI-Compliant System
(PCI) 0x0000000E (14) Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
(PCI) 0x00000010 (16) High Definition Audio Controller
(PCI) 0x00000010 (16) Intel(R) 8 Series/C220 Series PCI Express Root Port #1 - 8C10
(PCI) 0x00000010 (16) Intel(R) 8 Series/C220 Series PCI Express Root Port #5 - 8C18
(PCI) 0x00000010 (16) Intel(R) 8 Series/C220 Series USB EHCI #2 - 8C2D
(PCI) 0x00000013 (19) Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02


(PCI) 0x00000016 (22) High Definition Audio Controller
(PCI) 0x00000017 (23) Intel(R) 8 Series/C220 Series USB EHCI #1 - 8C26
(PCI) 0xFFFFFFF5 (-11) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF6 (-10) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF7 (-9) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF8 (-8) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFF9 (-7) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFFA (-6) Intel(R) I210 Gigabit Network Connection #2
(PCI) 0xFFFFFFFB (-5) Intel(R) Ethernet Connection I217-V
(PCI) 0xFFFFFFFC (-4) Intel(R) Management Engine Interface
(PCI) 0xFFFFFFFD (-3) Intel(R) USB 3.0 eXtensible Host Controller
(PCI) 0xFFFFFFFE (-2) Intel(R) HD Graphics

4.6 Memory Map

The memory mapping list is shown as follows:


Memory
[000A0000 - 000BFFFF] Intel(R) HD Graphics
[000A0000 - 000BFFFF] PCI bus
[000D0000 - 000D3FFF] PCI bus
[000D4000 - 000D7FFF] PCI bus
[000D8000 - 000DBFFF] PCI bus
[000DC000 - 000DFFFF] PCI bus
[000E0000 - 000E3FFF] PCI bus
[000E4000 - 000E7FFF] PCI bus
[3EA00000 - FEAFFFFF] PCI bus
[E0000000 - EFFFFFFF] Intel(R) HD Graphics
[F0000000 - F03FFFFF] Intel(R) HD Graphics
[F0400000 - F04FFFFF] Intel(R) I210 Gigabit Network Connection #2
[F0400000 - F05FFFFF] Intel(R) 8 Series/C220 Series PCI Express Root Port #5 - 8C18
[F0500000 - F0503FFF] Intel(R) I210 Gigabit Network Connection #2
[F0600000 - F061FFFF] Intel(R) Ethernet Connection I217-V
[F0620000 - F062FFFF] Intel(R) USB 3.0 eXtensible Host Controller
[F0630000 - F0633FFF] High Definition Audio Controller
[F0634000 - F0637FFF] High Definition Audio Controller
[F0639000 - F06390FF] Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
[F063A000 - F063A7FF] Intel(R) 8 Series/C220 Series SATA AHCI Controller - 8C02
[F063B000 - F063B3FF] Intel(R) 8 Series/C220 Series USB EHCI #1 - 8C26
[F063C000 - F063C3FF] Intel(R) 8 Series/C220 Series USB EHCI #2 - 8C2D
[F063D000 - F063DFFF] Intel(R) Ethernet Connection I217-V
[F063F000 - F063F00F] Intel(R) Management Engine Interface
[F7FEF000 - F7FEFFFF] Motherboard resources
[F7FF0000 - F7FF0FFF] Motherboard resources
[F8000000 - FBFFFFFF] Motherboard resources
[FED00000 - FED003FF] High precision event timer
[FED10000 - FED17FFF] Motherboard resources
[FED18000 - FED18FFF] Motherboard resources
[FED19000 - FED19FFF] Motherboard resources
[FED1C000 - FED1FFFF] Motherboard resources
[FED20000 - FED3FFFF] Motherboard resources
[FED40000 - FED44FFF] System board
[FED45000 - FED8FFFF] Motherboard resources
[FED90000 - FED93FFF] Motherboard resources
[FEE00000 - FEEFFFFF] Motherboard resources
[FF000000 - FFFFFFFF] Intel(R) 82802 Firmware Hub Device
[FF000000 - FFFFFFFF] Motherboard resources

Chapter 5
AMI BIOS Setup Utility

The AMI UEFI BIOS provides users with a built-in setup program to modify basic system configuration. All configured parameters are stored in a flash chip to save the setup information whenever the power is turned off. This chapter provides users with detailed description about how to set up basic system configuration through the AMI BIOS setup utility.

5.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press <F2> or <Del> during the Power On Self Test (POST) to enter BIOS setup, otherwise, POST will continue with its test routines.
2. After you press the <Del> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Advanced and Chipset menus.

Note

If your computer cannot boot after making and saving system changes with BIOS setup, you can restore BIOS optimal defaults by setting CLRCMOS1 (see section 2.3.1).

If you wish to enter BIOS setup after POST, restart the system by pressing <Ctrl>+<Alt>+ <Delete>, or by pressing the reset button on the system chassis. You may also restart by turning the system off and then back on.

It is strongly recommended that you should avoid changing the chipset's defaults. Both AMI and your system manufacturer have carefully set up these defaults that provide the best performance and reliability.

Note

Because the BIOS setup software is constantly being updated, the following setup screens and descriptions are for reference purpose only, and they may not exactly match what you see on your screen.

5.2 Menu Bar

The top of the screen has a menu bar with the following selections:

Menu Bar	Description
Main	To set up the system time/date information.
Advanced	To set up the advanced BIOS features.
H/W Monitor	To display current hardware status.
Boot	To set up the default system device to locate and load the operating system.
Security	To set up the security features.
Exit	To exit the current screen or the BIOS setup utility.

Use <←> key or <→> key to choose among the selections on the menu bar, and then press <Enter> to get into the sub screen. You can also use the mouse to click your required item.

5.3 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F7>, <Enter>, <ESC>, <Arrow> keys, and so on.

Note

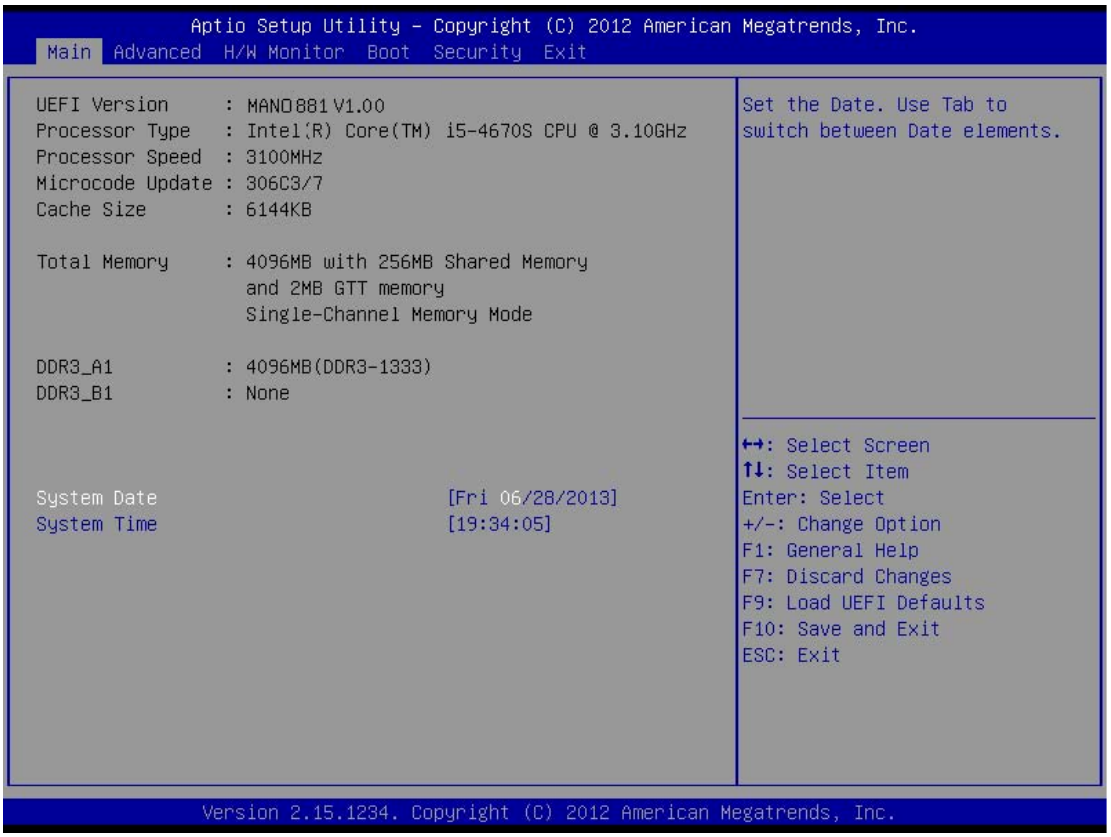
Some of the navigation keys differ from one screen to another.

Please check the following table for the function description of each navigation key.

Hot Keys	Description
→← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.
F1	The <F1> key allows you to display the General Help screen.
F7	Discard changes.
F9	The <F9> key allows you to load optimal default values for all the settings.
F10	The <F10> key allows you to save any changes you have made and exit Setup. Press the <F10> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.

5.4 Main Menu

When you first enter the setup utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is shown below.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced H/W Monitor Boot Security Exit
UEFI Version : MANO881 V1.00
Processor Type : Intel(R) Core(TM) i5-4670S CPU @ 3.10GHz
Processor Speed : 3100MHz
Microcode Update : 306C3/7
Cache Size : 6144KB
Total Memory : 4096MB with 256MB Shared Memory
and 2MB GTT memory
Single-Channel Memory Mode
DDR3_A1 : 4096MB(DDR3-1333)
DDR3_B1 : None
System Date [Fri 06/28/2013]
System Time [19:34:05]
Set the Date. Use Tab to
switch between Date elements.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

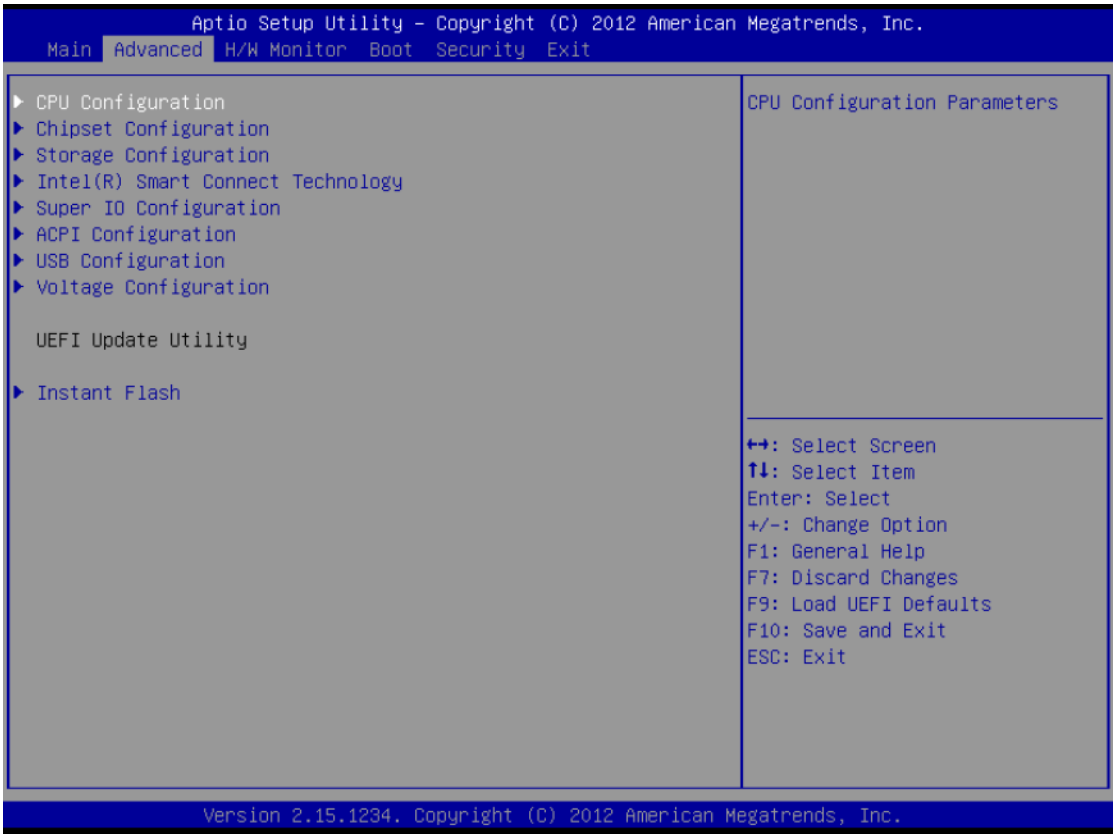
BIOS Information
Display the auto-detected BIOS information.

System Date/Time
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

5.5 Advanced Menu

The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ▶ CPU Configuration
- ▶ Chipset Configuration
- ▶ Storage Configuration
- ▶ Intel(R) Smart Connect Technology
- ▶ Super IO Configuration
- ▶ ACPI Configuration
- ▶ USB Configuration
- ▶ Voltage Configuration
- ▶ Instant Flash



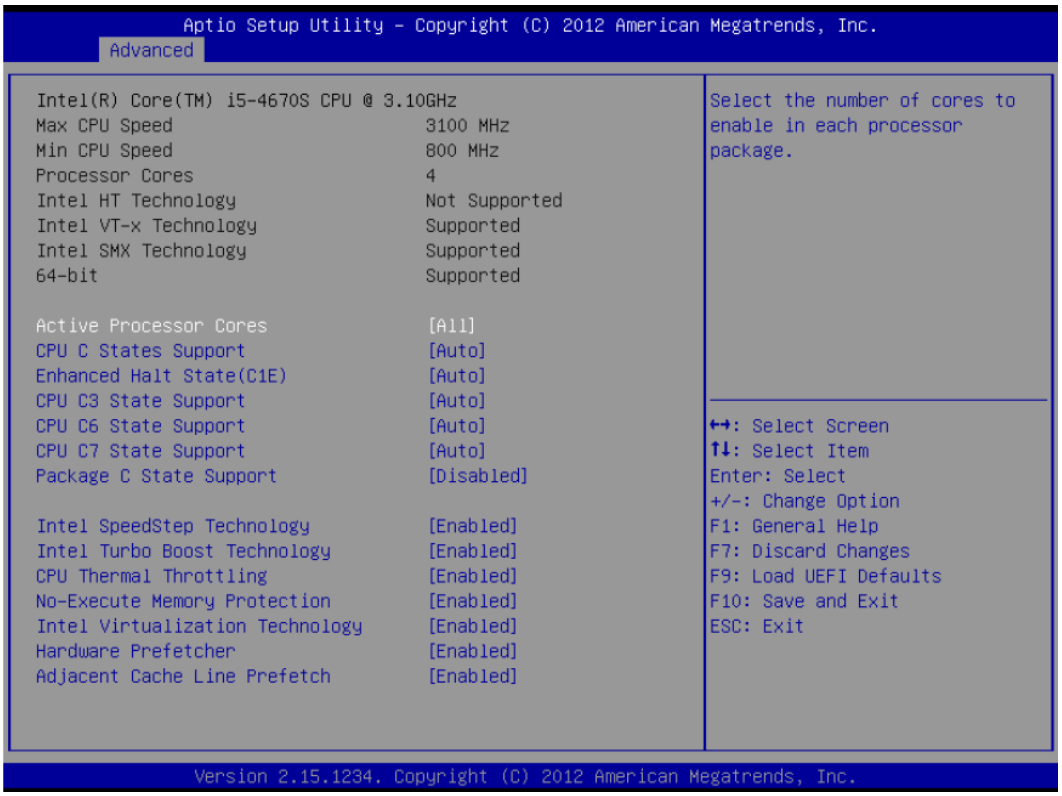
For items marked with "▶", please press <Enter> for more options.

Note ***Setting wrong values in this section may cause the system to malfunction.***

Instant Flash

Instant Flash is a UEFI flash utility embedded in Flash ROM. This convenient UEFI update tool allows you to update system UEFI without entering operating systems first like MS-DOS or Windows®. Just launch this tool and save the new UEFI file to your USB flash drive, floppy disk or hard drive, then you can update your UEFI only in a few clicks without preparing an additional floppy diskette or other complicated flash utility. Please be noted that the USB flash drive or hard drive must use FAT32/16/12 file system. If you execute Instant Flash utility, the utility will show the UEFI files and their respective information. Select the proper UEFI file to update your UEFI, and reboot your system after UEFI update process completes.

- **CPU Configuration**


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Intel(R) Core(TM) i5-4670S CPU @ 3.10GHz
Max CPU Speed 3100 MHz
Min CPU Speed 800 MHz
Processor Cores 4
Intel HT Technology Not Supported
Intel VT-x Technology Supported
Intel SMX Technology Supported
64-bit Supported
Active Processor Cores [All]
CPU C States Support [Auto]
Enhanced Halt State(C1E) [Auto]
CPU C3 State Support [Auto]
CPU C6 State Support [Auto]
CPU C7 State Support [Auto]
Package C State Support [Disabled]
Intel SpeedStep Technology [Enabled]
Intel Turbo Boost Technology [Enabled]
CPU Thermal Throttling [Enabled]
No-Execute Memory Protection [Enabled]
Intel Virtualization Technology [Enabled]
Hardware Prefetcher [Enabled]
Adjacent Cache Line Prefetch [Enabled]
Select the number of cores to enable in each processor package.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

Active Processor Cores
Select the number of cores to enable in each processor package.

CPU C States Support
Enable CPU C States Support for power saving. It is recommended to keep C3, C6 and C7 all enabled for better power saving.

Enhanced Halt State (C1E)
Enable Enhanced Halt State (C1E) for lower power consumption.

CPU C3 State Support
Enable C3 sleep state for lower power consumption.

CPU C6 State Support
Enable C6 deep sleep state for lower power consumption.

CPU C7 State Support
Enable C7 deep sleep state for lower power consumption.

Package C State Support
Enable CPU, PCI-Express, Memory, Graphics C State Support for power saving.

Intel SpeedStep Technology
Intel® SpeedStep technology is Intel®'s new power saving technology. Processors can switch between multiple frequencies and voltage points to enable power saving. The default value is Enabled. Configuration options are Enabled and Disabled. If you install Windows® 7 / 8 and want to enable this function, please set this item to [Enabled]. This item will be hidden if the current CPU does not support Intel SpeedStep technology.

Note

Please note that enabling this function may reduce CPU voltage and lead to system stability or compatibility issues with some power supplies. Please set this item to Disabled if above issues occur.

Intel Turbo Boost Technology
Use this item to enable or disable Intel® Turbo Boost Mode Technology. Turbo Boost Mode allows processor cores to run faster than marked frequency in specific conditions. The default value is Enabled.

CPU Thermal Throttling
You may select Enabled to enable CPU internal thermal control mechanism to keep the CPU from overheating.

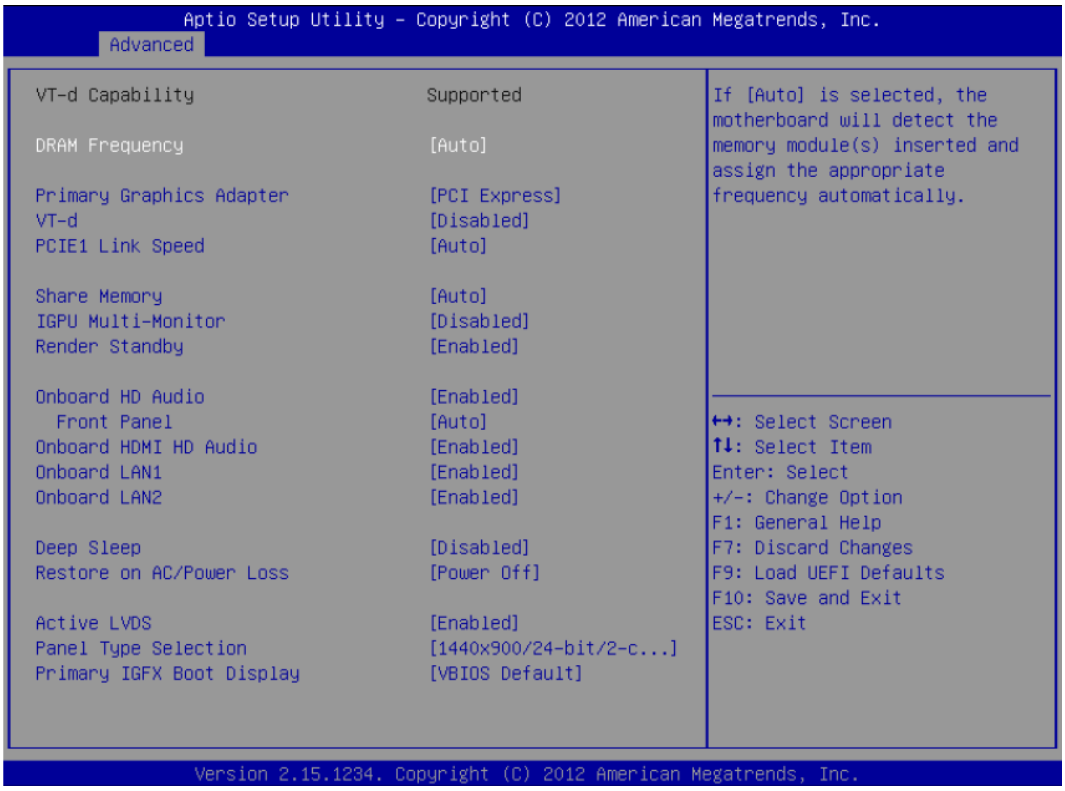
No-Execute Memory Protection
No-Execution (NX) Memory Protection Technology is an enhancement to the IA-32 Intel Architecture. An IA-32 processor with "No Execute (NX) Memory Protection" can prevent data pages from being used by malicious software to execute codes. This option will be hidden if the current CPU does not support No-Execute Memory Protection.

Intel Virtualization Technology
When this option is set to Enabled, a VMM (Virtual Machine Architecture) can utilize the additional hardware capabilities provided by Vanderpool Technology. This option will be hidden if the installed CPU does not support Intel® Virtualization Technology.

Hardware Prefetcher
Use this item to turn on/off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch
Use this item to turn on/off prefetching of adjacent cache lines.

- **Chipset Configuration**


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
VT-d Capability Supported
DRAM Frequency [Auto]
Primary Graphics Adapter [PCI Express]
VT-d [Disabled]
PCIE1 Link Speed [Auto]
Share Memory [Auto]
IGPU Multi-Monitor [Disabled]
Render Standby [Enabled]
Onboard HD Audio [Enabled]
Front Panel [Auto]
Onboard HDMI HD Audio [Enabled]
Onboard LAN1 [Enabled]
Onboard LAN2 [Enabled]
Deep Sleep [Disabled]
Restore on AC/Power Loss [Power Off]
Active LVDS [Enabled]
Panel Type Selection [1440x900/24-bit/2-c...]
Primary IGFX Boot Display [VBIOS Default]
If [Auto] is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

DRAM Frequency
If Auto is selected, the motherboard will detect the memory module(s) inserted and assign the appropriate frequency automatically.

Primary Graphics Adapter
This allows you to select Onboard or PCI Express as the boot graphic adapter priority. The default value is PCI Express.

VT-d
Use this to enable or disable Intel® VT-d technology (Intel® Virtualization Technology for Directed I/O). The default value of this feature is Disabled.

PCIE1 Link Speed
Select the link speed for PCIE1.

Share Memory
Configure the size of memory that is allocated to the integrated graphics processor when the system boots up.

IGPU Multi-Monitor
Select Disabled to disable the integrated graphics when an external graphics card is installed. Select Enabled to keep the integrated graphics enabled at all times.

Render Standby
Use this to enable or disable Render Standby by Internal Graphics Device. The default value is Enabled.

Onboard HD Audio
Select Auto, Enabled or Disabled for the onboard HD Audio feature. If you select Auto, the onboard HD Audio will be disabled when PCI Sound Card is plugged.

Front Panel
Select Auto or Disabled for the onboard HD Audio Front Panel.

Onboard HDMI HD Audio
This allows you to enable or disable the Onboard HDMI HD Audio feature.

Onboard LAN1
This allows you to enable or disable the Onboard LAN1 feature.

Onboard LAN2
This allows you to enable or disable the Onboard LAN2 feature.

Deep Sleep
Mobile platforms support Deep S4/S5 in DC only and desktop platforms support Deep S4/S5 in AC only. The default value is Disabled.

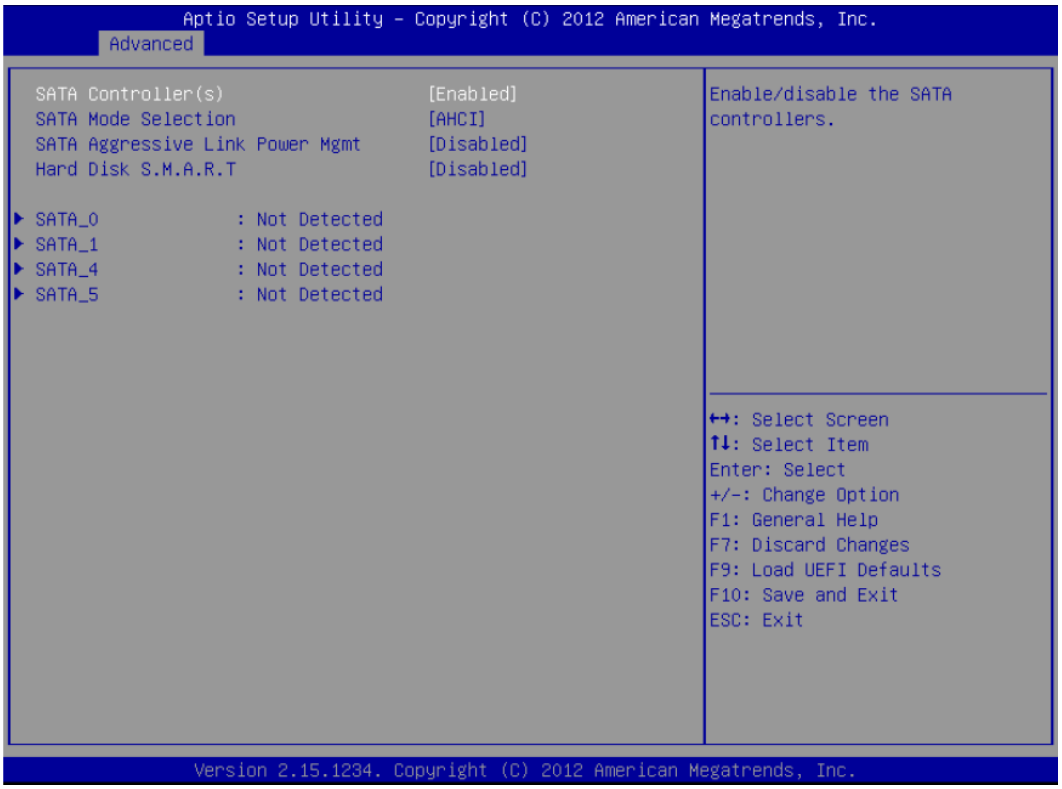
Restore on AC/Power Loss
This allows you to set the power state after an unexpected AC/power loss. If Power Off is selected, the AC/power remains off when the power recovers. If Power On is selected, the AC/power resumes and the system starts to boot up when the power recovers.

Active LVDS
Use this to enable or disable the LVDS. The default value is Enabled.

Panel Type Selection
Use this to select panel type.

Primary IGFX Boot Display
Select the video device which will be activated during POST. This has no effect if external graphics present. Secondary boot display selection will appear based on your selection. VGA modes will be supported only on primary display. Configuration options are VBIOS Default, CRT, DVI, HDMI and LVDS. The default value is VBIOS Default.

- **Storage Configuration**


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
SATA Controller(s) [Enabled]
SATA Mode Selection [AHCI]
SATA Aggressive Link Power Mgmt [Disabled]
Hard Disk S.M.A.R.T [Disabled]
SATA_0 : Not Detected
SATA_1 : Not Detected
SATA_4 : Not Detected
SATA_5 : Not Detected
Enable/disable the SATA controllers.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

SATA Controller(s)
Use this item to enable or disable the SATA Controller feature.

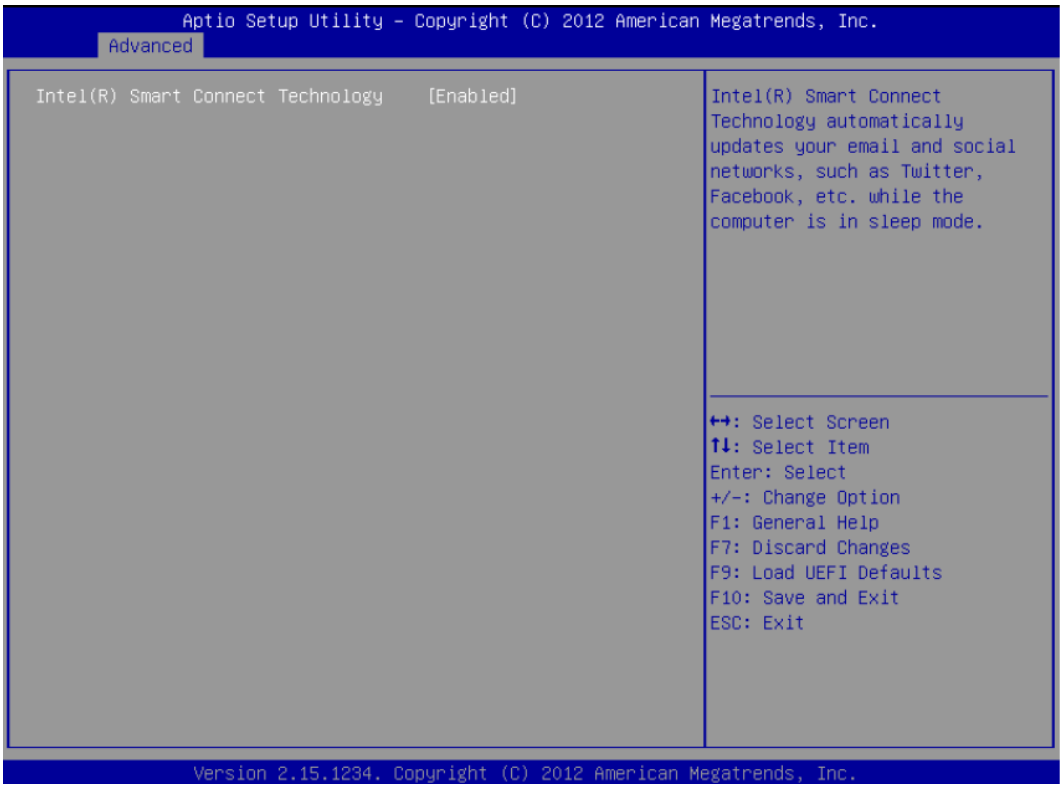
SATA Mode Selection
Use this to select SATA mode. Configuration options are IDE Mode, AHCI Mode and RAID Mode. The default value is AHCI Mode.

Note ***AHCI (Advanced Host Controller Interface) supports NCQ and other new features that will improve SATA disk performance but IDE mode does not have these advantages.***

SATA Aggressive Link Power Mgmt
Use this item to configure SATA Aggressive Link Power Management.

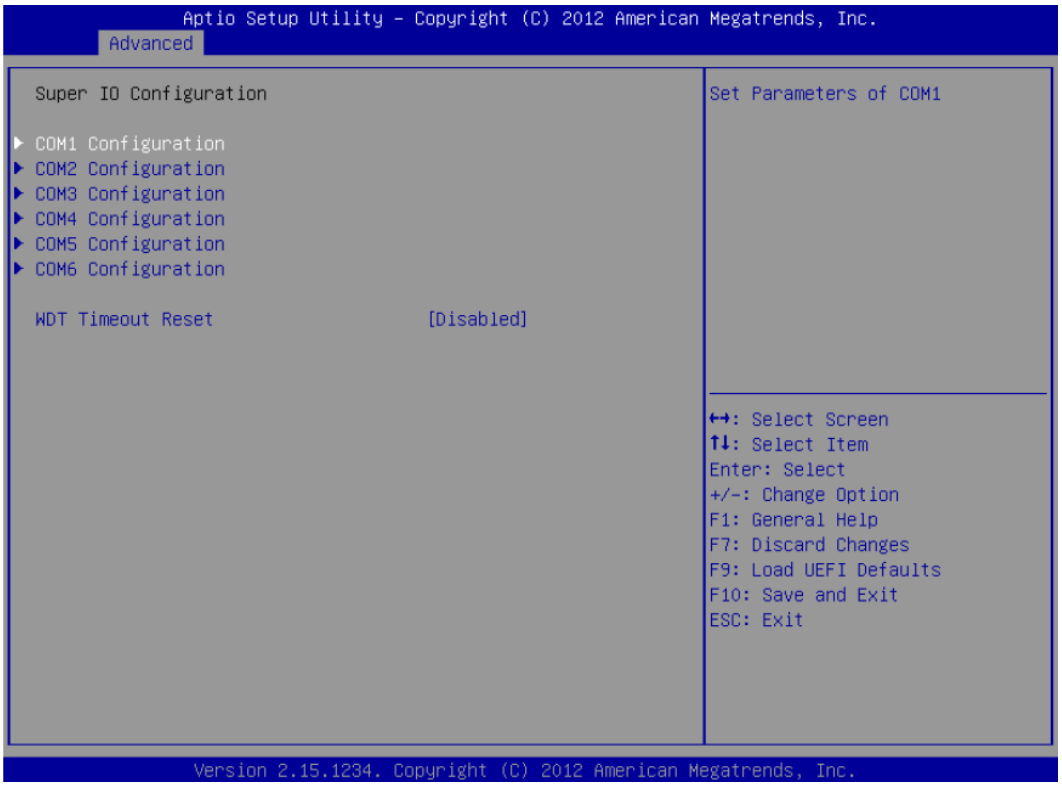
Hard Disk S.M.A.R.T.
Use this item to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology) feature. Configuration options are Disabled and Enabled.

- **Intel(R) Smart Connect Technology**


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Intel(R) Smart Connect Technology [Enabled]
Intel(R) Smart Connect Technology automatically updates your email and social networks, such as Twitter, Facebook, etc. while the computer is in sleep mode.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

Intel(R) Smart Connect Technology
Use this item to enable or disable Intel(R) Smart Connect Technology. Intel(R) Smart Connect Technology keeps your e-mail and social networks, such as Twitter, Facebook, etc. updated automatically while the computer is in sleep mode. The default is Enabled.

- **Super IO Configuration**



COM1 Configuration
Use this to set parameters of COM1. COM1 port type options are RS232, RS422 or RS485.

COM2 Configuration
Use this to set parameters of COM2. COM2 port type options are RS232, RS422 or RS485.

COM3 Configuration
Use this to set parameters of COM3. COM3 port type options are RS232, RS422 or RS485.

COM4 Configuration
Use this to set parameters of COM4.

COM5 Configuration
Use this to set parameters of COM5.

COM6 Configuration
Use this to set parameters of COM6.

WDT Timeout Reset
This allows users to enable/disable the Watchdog timer timeout to reset system. The default value is Disabled.

- **ACPI Configuration**

Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
Suspend to RAM [Auto]
Check Ready Bit [Enabled]
ACPI HPET Table [Enabled]
PS/2 Keyboard Power On [Disabled]
PCI Devices Power On [Disabled]
Wake From Onboard LAN 2 [Disabled]
RTC Alarm Power On [By OS]
USB Keyboard/Remote Power On [Disabled]
USB Mouse Power On [Disabled]
Select disable for ACPI suspend type S1. It is recommended to select auto for ACPI S3 power saving.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

Suspend to RAM
Use this item to select whether to auto-detect or disable the Suspend-to-RAM feature. Select Auto will enable this feature if the OS supports it.

Check Ready Bit
Use this item to enable or disable the feature Check Ready Bit.

ACPI HPET Table
Use this item to enable or disable ACPI HPET Table. The default value is Enabled. Please set this option to Enabled if you plan to use this motherboard to submit Windows® certification.

PS/2 Keyboard Power On
Use this item to enable or disable PS/2 keyboard to turn on the system from the power-soft-off mode.

PCI Devices Power On
Use this item to enable or disable PCI devices to turn on the system from the power-soft-off mode.

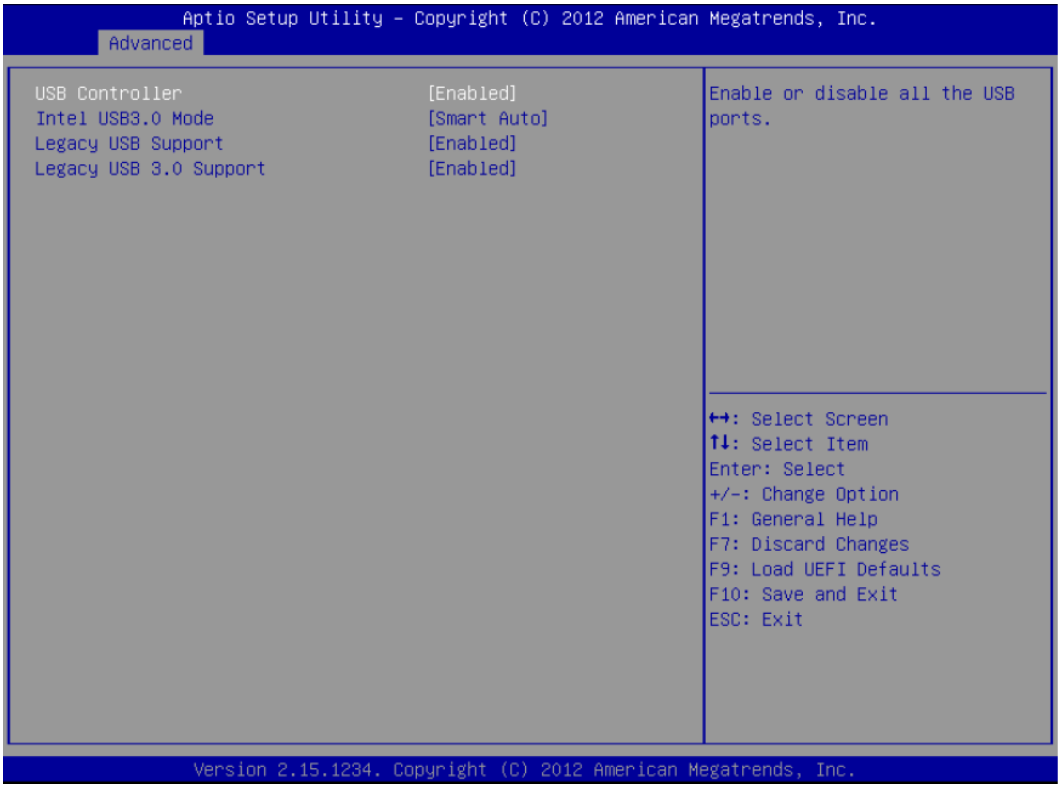
Wake From Onboard LAN 2
Use this item to enable or disable the Wake From Onboard LAN 2 feature.

RTC Alarm Power On
Use this item to enable or disable RTC (Real Time Clock) to power on the system.

USB Keyboard/Remote Power On
Use this item to enable or disable USB Keyboard/Remote to power on the system.

USB Mouse Power On
Use this item to enable or disable USB Mouse to power on the system.

- **USB Configuration**


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Advanced
USB Controller [Enabled]
Intel USB3.0 Mode [Smart Auto]
Legacy USB Support [Enabled]
Legacy USB 3.0 Support [Enabled]
Enable or disable all the USB ports.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

USB Controller
Use this item to enable or disable the use of USB controller.

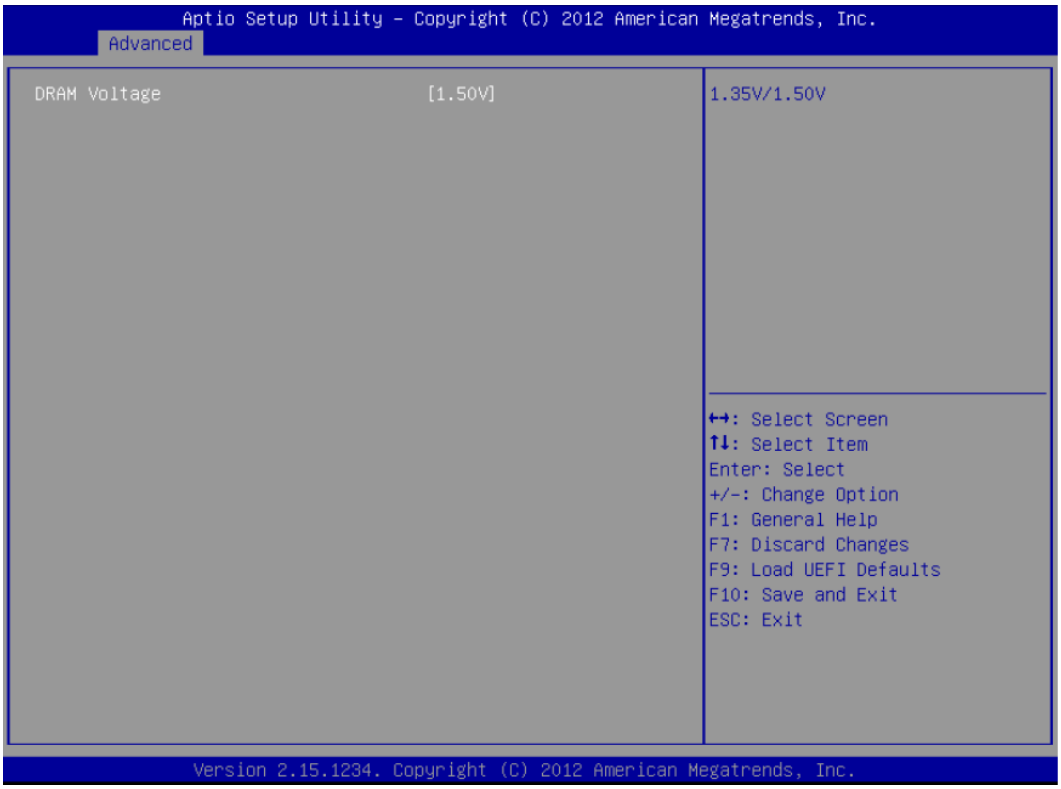
Intel USB 3.0 Mode
Use this item to enable or disable the use of Intel® USB 3.0 mode.

Legacy USB Support
Use this option to select legacy support for USB devices. There are four configuration options: Enabled, Auto, Disabled and UEFI Setup Only. The default value is Enabled. Please refer to below descriptions for the details of these four options:

[Enabled] -	Enable support for legacy USB.
[Auto] -	Enable legacy support if USB devices are connected.
[Disabled] -	USB devices are not allowed to use under legacy OS and UEFI setup when Disabled is selected. If you have USB compatibility issues, it is recommended to select Disabled to enter OS.
[UEFI Setup Only] -	USB devices are allowed to use only under UEFI setup and Windows® / Linux OS.

Legacy USB 3.0 Support
Use this option to enable or disable legacy support for USB 3.0 devices. The default value is Enabled.

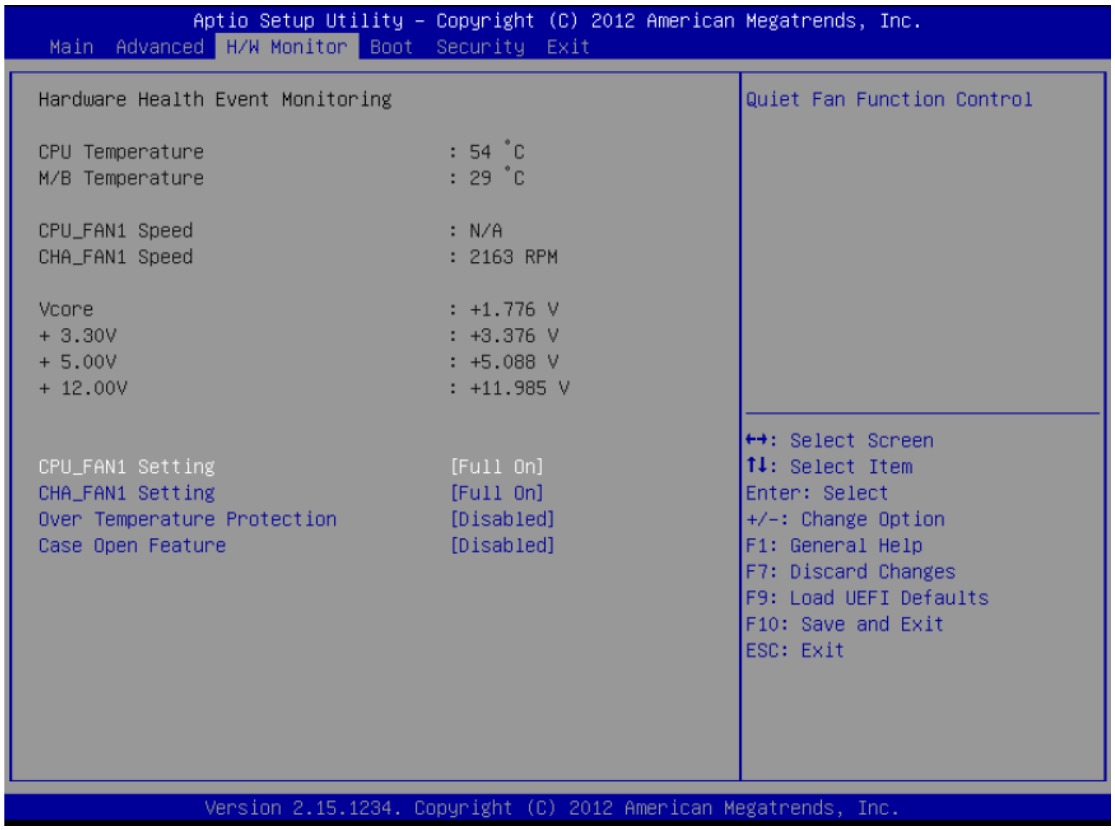
- **Voltage Configuration**



DRAM Voltage
Use this to select DRAM Voltage. The default value is 1.50V.

5.6 H/W Monitor Menu

In this section, it allows you to monitor the status of the hardware on your system, including the parameters of the CPU temperature, motherboard temperature, CPU fan speed, chassis fan speed, and the critical voltage.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced H/W Monitor Boot Security Exit
Hardware Health Event Monitoring
CPU Temperature : 54 °C
M/B Temperature : 29 °C
CPU_FAN1 Speed : N/A
CHA_FAN1 Speed : 2163 RPM
Vcore : +1.776 V
+ 3.30V : +3.376 V
+ 5.00V : +5.088 V
+ 12.00V : +11.985 V
CPU_FAN1 Setting [Full On]
CHA_FAN1 Setting [Full On]
Over Temperature Protection [Disabled]
Case Open Feature [Disabled]
Quiet Fan Function Control
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

CPU_FAN1 Setting
This allows you to set CPU fan 1's speed. Configuration options are Full On and Automatic Mode. The default value is Full On.

CHA_FAN1 Setting
This allows you to set chassis fan 1's speed. Configuration options are Full On and Automatic Mode. The default value is Full On.

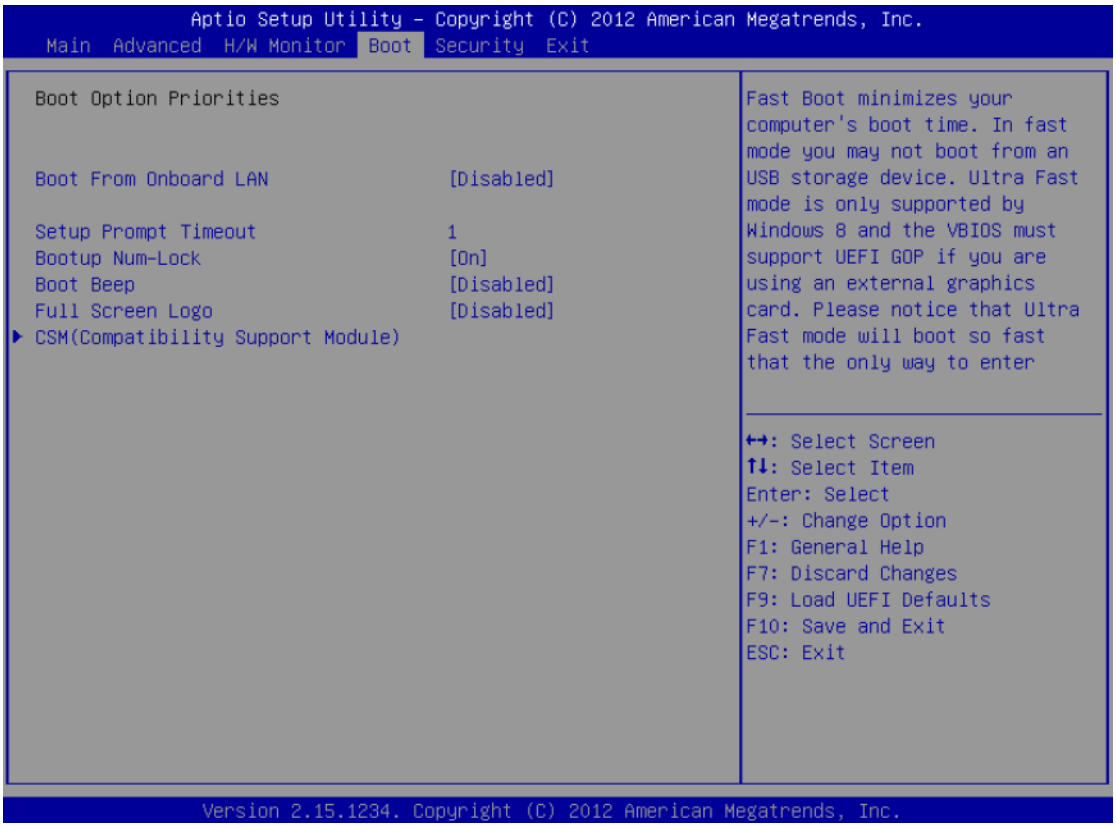
Over Temperature Protection
Use this to enable or disable Over Temperature Protection. The default value is Enabled.

Case Open Feature
This allows you to enable or disable case open detection feature. The default value is Disabled.

Clear Status
This option appears only when the case open has been detected. Use this option to keep or clear the record of previous chassis intrusion status.

5.7 Boot Menu

In this section, it will display the available devices on your system for you to configure the boot settings and the boot priority.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced H/W Monitor Boot Security Exit
Boot Option Priorities
Boot From Onboard LAN [Disabled]
Setup Prompt Timeout 1
Bootup Num-Lock [On]
Boot Beep [Disabled]
Full Screen Logo [Disabled]
CSM(Compatibility Support Module)
Fast Boot minimizes your computer's boot time. In fast mode you may not boot from an USB storage device. Ultra Fast mode is only supported by Windows 8 and the VBIOS must support UEFI GOP if you are using an external graphics card. Please notice that Ultra Fast mode will boot so fast that the only way to enter
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
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Boot From Onboard LAN
Use this item to enable or disable the Boot From Onboard LAN feature.

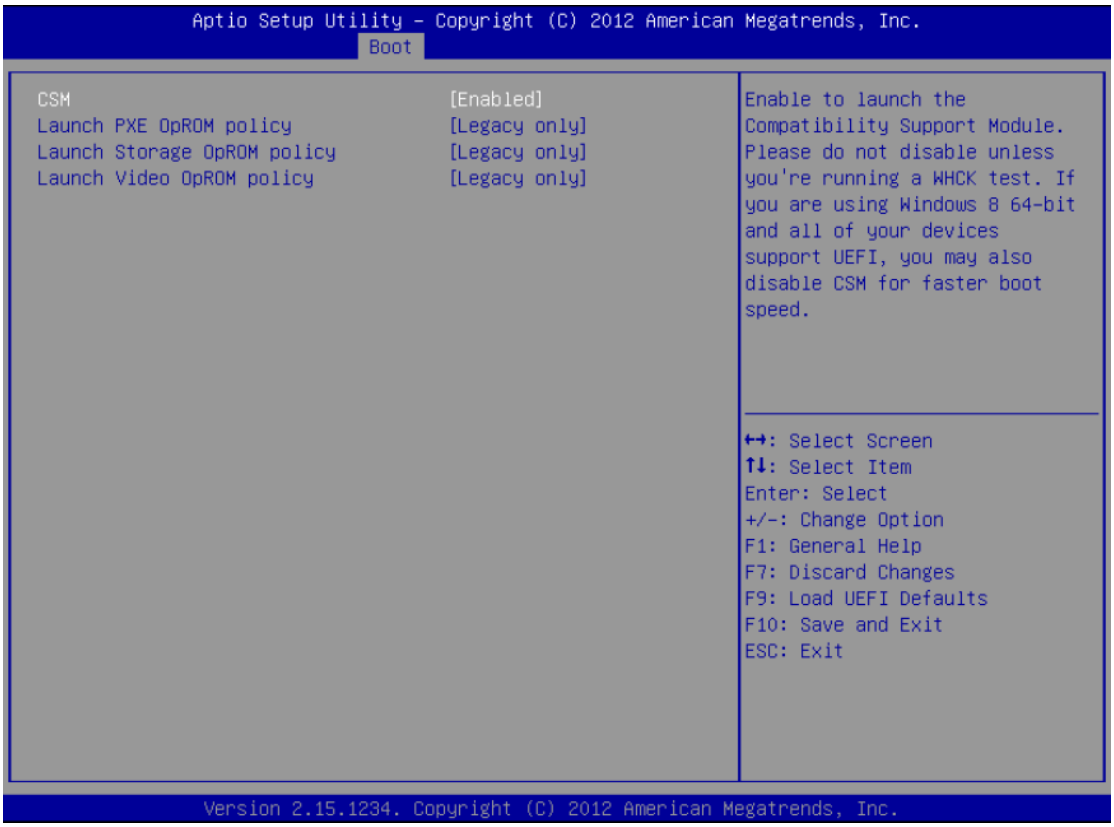
Setup Prompt Timeout
This shows the number of seconds to wait for setup activation key. 65535(0XFFFF) means indefinite waiting.

Bootup Num-Lock
If this item is set to On, it will automatically activate the Numeric Lock function after boot-up.

Boot Beep
Select whether the Boot Beep should be turned on or off when the system boots up. Please note that a buzzer is needed.

Full Screen Logo
Use this item to enable or disable OEM Logo. The default value is Enabled.

CSM
Please disable CSM when you enable Fast Boot option. The default value is Enabled.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Boot
CSM [Enabled]
Launch PXE OpROM policy [Legacy only]
Launch Storage OpROM policy [Legacy only]
Launch Video OpROM policy [Legacy only]
Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test. If you are using Windows 8 64-bit and all of your devices support UEFI, you may also disable CSM for faster boot speed.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

CSM
Enable to launch the Compatibility Support Module. Please do not disable unless you're running a WHCK test. If you are using Windows® 8 64-bit and all of your devices support UEFI, you may also disable CSM for faster boot speed.

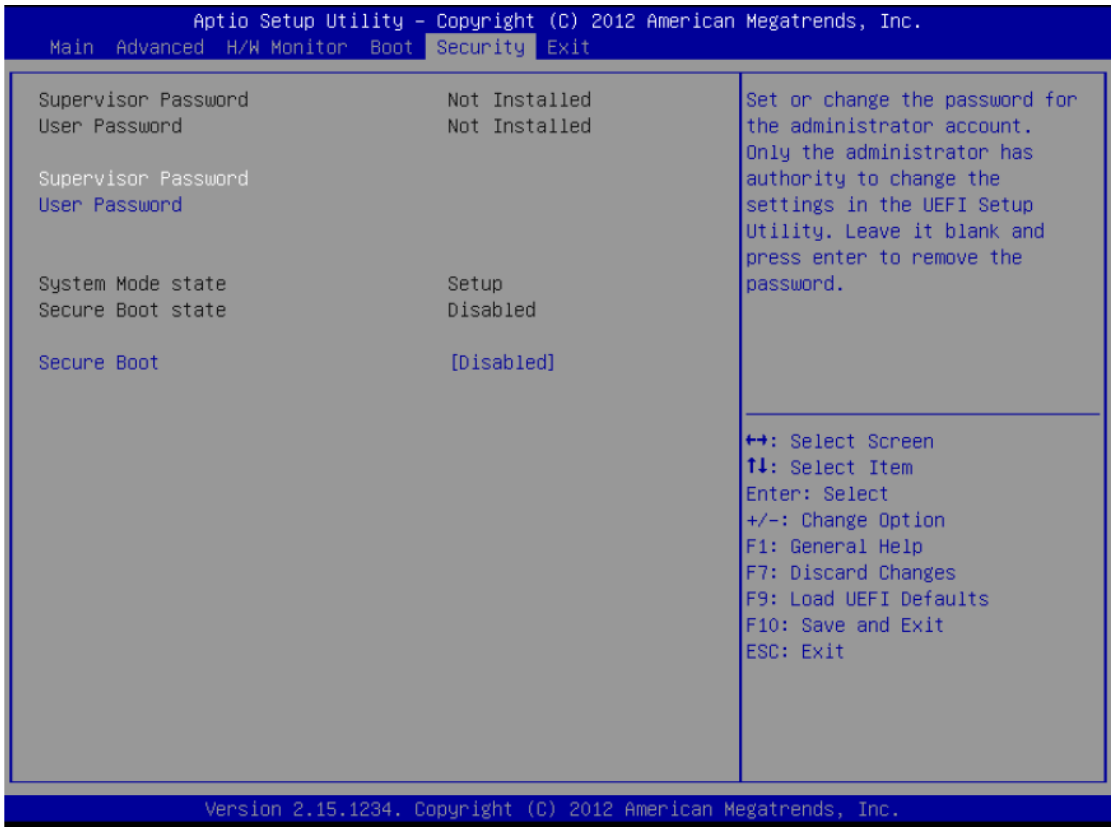
Launch PXE OpROM Policy
Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only.

Launch Storage OpROM Policy
Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only.

Launch Video OpROM Policy
Select UEFI only to run those that support UEFI option ROM only. Select Legacy only to run those that support legacy option ROM only.

5.8 Security Menu

In this section, you may set, change or clear the supervisor/user password for the system.


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced H/W Monitor Boot Security Exit
Supervisor Password Not Installed
User Password Not Installed
Supervisor Password
User Password
System Mode state Setup
Secure Boot state Disabled
Secure Boot [Disabled]
Set or change the password for the administrator account. Only the administrator has authority to change the settings in the UEFI Setup Utility. Leave it blank and press enter to remove the password.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
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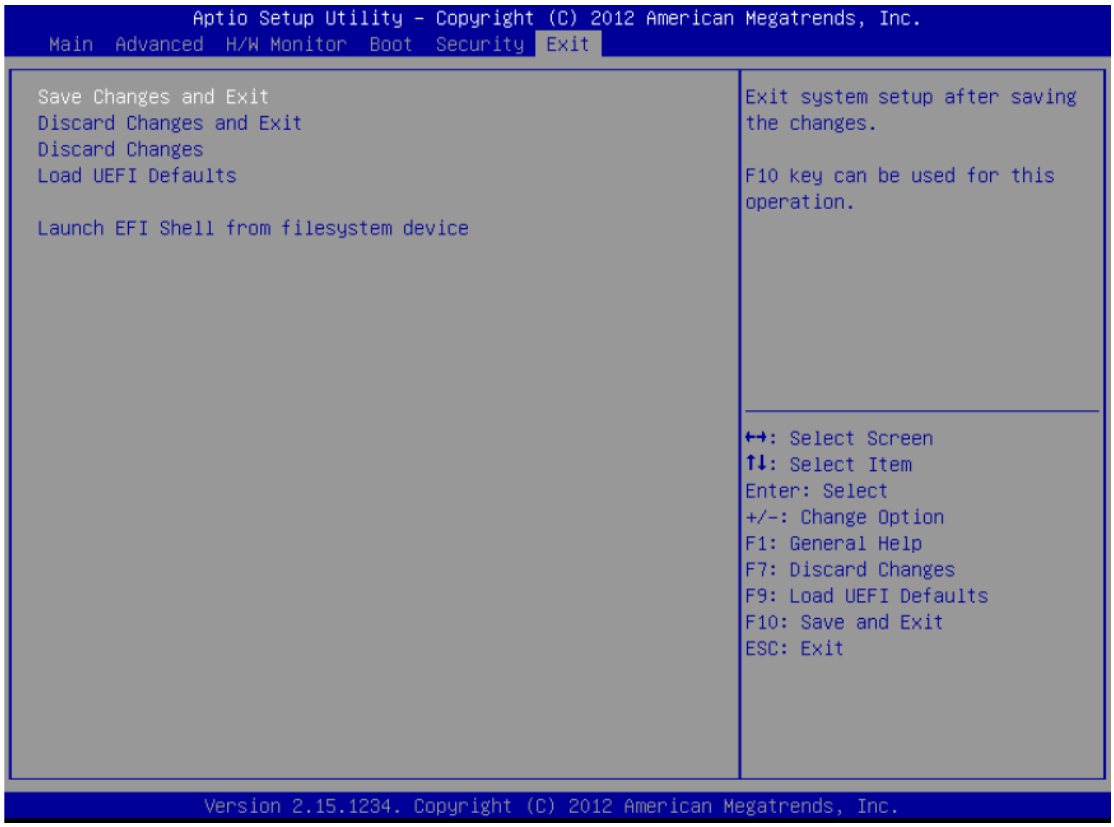
Secure Boot
Use this to enable or disable Secure Boot. The default value is Disabled.

5.9 Exit Menu


Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
Main Advanced H/W Monitor Boot Security Exit
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load UEFI Defaults
Launch EFI Shell from filesystem device
Exit system setup after saving the changes.
F10 key can be used for this operation.
↔: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Option
F1: General Help
F7: Discard Changes
F9: Load UEFI Defaults
F10: Save and Exit
ESC: Exit
Version 2.15.1234. Copyright (C) 2012 American Megatrends, Inc.

Save Changes and Exit
When you select this option, it will pop-out the following message, “Save configuration changes and exit setup?”. Select OK to save the changes and exit the UEFI setup utility.

Discard Changes and Exit
When you select this option, it will pop-out the following message, “Discard changes and exit setup?”. Select OK to exit the UEFI setup utility without saving any changes.

Discard Changes
When you select this option, it will pop-out the following message, “Discard changes?”. Select OK to discard all changes.

Load UEFI Defaults
Load UEFI default values for all the setup questions. F9 key can be used for this operation.

Launch EFI Shell from filesystem device
Attempt to Launch EFI Shell application (Shell64.efi) from one of the available filesystem devices.